JULY 16, 1951

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

PROTECTIVE PACKAGING

for military use

—see page 70

A BELLWETHER INDUSTRY
—High Volume Peace or War, p. 41

FIRST BIG CMP SNAG
—Threat in Steel Distribution, p. 43

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—Small Plants Benefit Too, p. 74

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—Applications Are Expanding, p. 75

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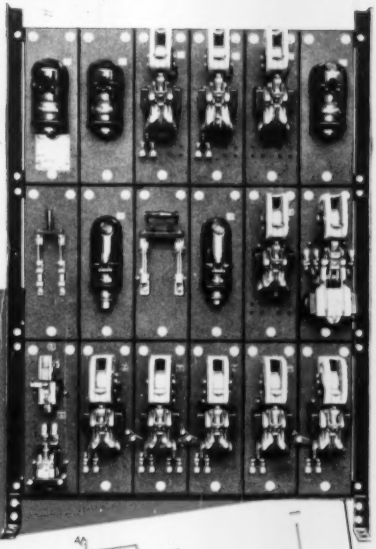
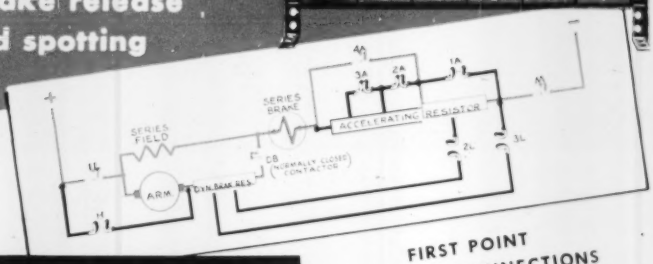
8 *Important Features of* **EC&M** *Magnetic Control*

1. Time-Current Acceleration
2. Line-Arc Contactors
3. Wright Hoist Circuit
4. Tab-Weld Resistors
5. Cam Master Switches
6. Safer Electrical Interlocks
7. Bolted, Welded Frame
8. Quick Contact Renewing

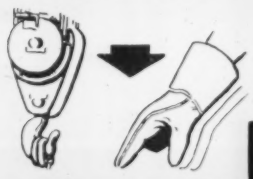


THE WRIGHT DYNAMIC LOWERING CIRCUIT FOR CRANE HOISTS

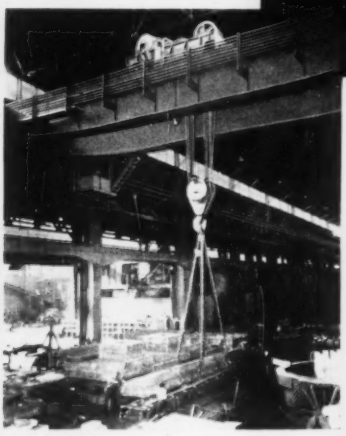
1. gives fast brake release
2. accurate load spotting



FIRST POINT LOWERING CONNECTIONS



Where good inching means fewer movements— reduced wear



The EC&M Wright Circuit for Crane Hoists is well-known for its ability to spot a heavy load accurately.

Look at the diagram of the first point lowering connections. Note the line in red showing that all the current taken from the line goes through the brake coil for fast brake release. Combined with fast operating LINE-ARC Contactors, the loaded crane-hook can be inched down with ease. A heavy load is carefully landed—with a minimum number of movements which maintenance men recognize as a contributing factor to reduced upkeep and wear.

When buying cranes, specify EC&M Magnetic Control.

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Mayari R angles are used for main members in the 150-ft boom of this retractable gantry crane, capable of handling 17,100 lbs at a 40-ft radius. The boom can also be fitted with a 30-ft jib extension.

Boom made of MAYARI R 30 ft longer and 2000 lbs lighter

Problem: In redesigning the boom on their model K-580 retractable gantry crane, the Link-Belt Speeder Corporation had two objectives in mind: (1) The boom had to be increased from 120 ft to 150 ft in length. (2) The deadweight of the new boom had to be reduced by 2000 lbs, in spite of its greater length.

Solution: After they studied the mechanical properties of various grades of steel the engineers concluded that Bethlehem's Mayari R would do the job at low cost. The main longitudinal members were made of Mayari R angles of thinner gage than ordinarily used with structural-grade carbon steel. This reduced the deadweight and at the same time provided the extra strength needed for the longer structure. Because of the reduction in weight made possible with Mayari R, the crane has a lifting capacity 1000 lbs greater than with the previous booms.

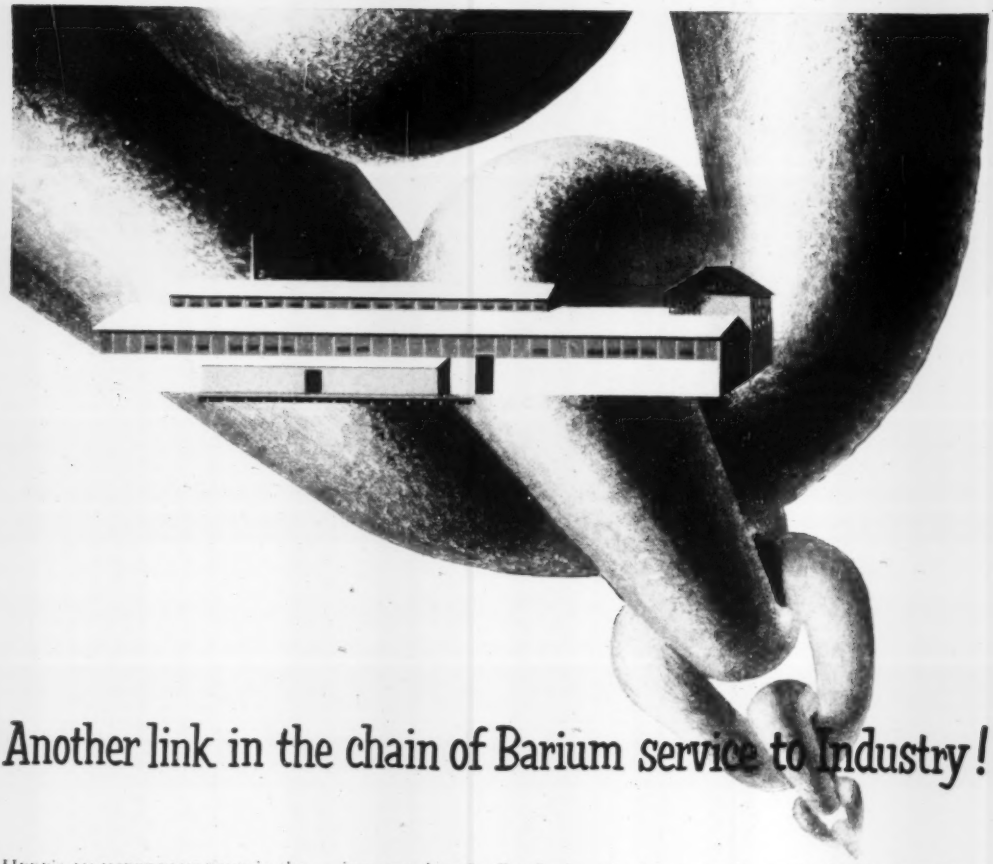
If you are building construction equipment of any type, it will pay you to look into the advantages of low-alloy, high-strength Mayari R. It goes farther than ordinary steel, and it allows worthwhile improvements in design. Write for a copy of Mayari R catalog 259.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

Mayari R *makes it lighter... stronger... longer lasting*



Another link in the chain of Barium service to Industry!

HERE'S AN IMPORTANT LINK in the chain of Barium subsidiaries supplying industry with steel in many forms.

It's Bayonne Bolt Corporation, producer of nuts, rivets and related steel products.

Because Bayonne is part of Barium, you benefit. For Barium Steel Corporation is a team of strategically located companies working closely together, bringing joint knowledge to bear to solve your steel problems. It's a single source controlling quality from blast furnace to finished product . . . ready to work as a self-contained unit to speed urgently needed orders.

At no obligation, put Barium ingenuity to work for you . . . on plate, structurals, fabrications, forgings, stampings, springs, bolts, nuts. Address Barium at 25 Broad Street, New York City.

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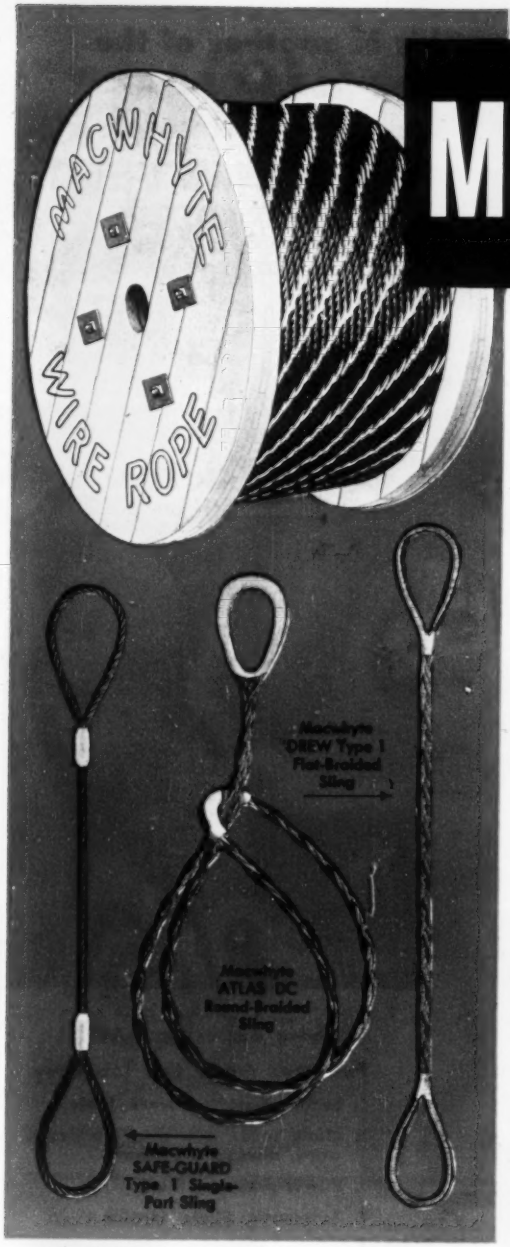
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Macwhyte DREW Type 1 Flat-Braided Sling
Macwhyte ATLAS DC Round-Braided Sling
Macwhyte SAFE-GUARD Type 1 Single-Part Sling

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For better service and more economy

Order from *a thousand and one*

MACWHYTE WIRE ROPES

In the complete Macwhyte line are Internally Lubricated PREformed Wire Ropes for all equipment—plus Galvanized, Stainless Steel, and Monel Metal Wire Ropes. Special assemblies of Macwhyte Wire Rope and Industrial Standards "Safe-Lock" fittings. Fittings swaged to rope in assemblies made to order.

MACWHYTE SLINGS made to order

All types, sizes and lengths. Macwhyte ATLAS Round-Braided Slings, Drew Flat-Braided Slings and Monarch Single-Part Wire Rope Slings are all made to order for each job.

WHATEVER YOUR NEEDS

for wire rope, slings, special assemblies, solutions for special problems, call a Macwhyte distributor or write Macwhyte Company. Catalog on request.

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999SW

This is another of the "HUNDREDS OF JOBS" which can be done on a MARVEL Band Saw!

MARVEL BAND SAW saved these two 4400 lb. castings

Two sand cores washed out when these giant 4400 pound steel connecting rods were cast, resulting in solid eye ends without gaps. Then came the $64 question—how to machine out the 1½" slots in the longitudinal center of the eyes which were 22" high and had a wall thickness of 6½".

The Ernest J. Nelson Iron Works of San Francisco, did this "impossible" job easily, quickly, and economically, without special tooling, on a standard Model #8M/2 MARVEL Band Saw. Two cuts were made in each rod in two hours per cut with tool cost of $3.06 per rod. The tool was a MARVEL B9-10 Band Saw Blade.

Every tool room, machine shop and maintenance department needs a MARVEL Series 8 Universal Band Saw—not only for innumerable everyday jobs but for the occasional "trick" operations, where its utmost versatility will save many headaches and dollars.

WRITE FOR CATALOG

MARVEL *Metal Cutting* SAWS

These exclusive MARVEL Features made this job easy.

1. Large, T-slotted work table.
2. Blade feeds into work vertically; work always stationary.
3. Power-pressure feed.
4. Automatic Blade tension.
5. Built-in coolant system.
6. Large capacity.

ARMSTRONG-BLUM MFG. CO.

5700 BLOOMINGDALE AVENUE **CHICAGO 39, ILLINOIS**

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STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 3 JULY 16, 1951

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Editorial and Business Staff—Page 10. Advertising Index—Page 162. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week . . . **Obsolete Equipment—Emergency Scrap Reservoir . . . Adequate Instrumentation Minimizes Welding Variable . . . Forgings Descaled 90 Per Cent Cheaper . . . Refined Honing Method Levels "Hills and Valleys"**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Single copies (current issues) 35 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

Lapping Carbide 20% Faster!

Carbide spray nozzle orifices are finished to tolerances of .0005" at Spraying Systems Company, Bellwood, Illinois. New Elgin DYMO-C diamond abrasive used in place of diamond powder-oil mixture produces more pieces per hour and conserves diamond, too!

ELGIN DYMO-C*
diamond abrasives
*C FOR CARBIDE

Here is a complete new diamond abrasive specially prepared to speed carbide finishing operations. It cuts faster, won't work back on the lap, won't settle and comes ready to use without time-consuming mixing. Write for complete information—ask for a free demonstration.

ALL ELGIN DIAMOND ABRASIVES ARE COMPLETELY PRODUCED BY ELGIN AND CERTIFIED TO CONFORM TO U. S. BUREAU OF STANDARDS SPECIFICATIONS.

Product of
ELGIN NATIONAL WATCH CO.
ELGIN, ILLINOIS

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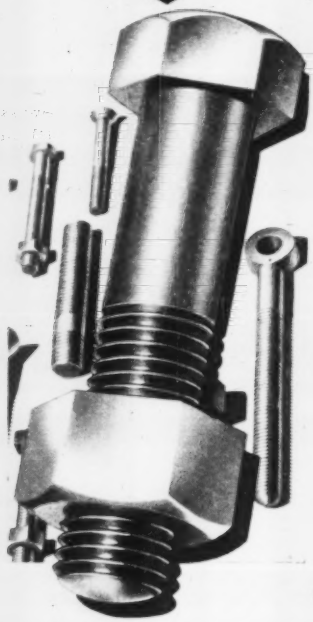
BOLTS
NUTS
STUDS



★ Carbon Steel
★ Heat-treated Alloy Steels
★ Stainless Steel
★ Silicon Bronze
★ Naval Brass
★ Monel Metal

You can count on a uniform Class 3 Fit when you buy Pawtucket threaded fasteners. Accurately made in standard dimensions — or to your specifications.

BETTER BOLTS SINCE 1882

Use Headed and Threaded Fasteners for Economy and Reliability

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"THE BOLT MAN"
MANUFACTURING COMPANY
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THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.

Behind the Scenes...

Self-Conference

This specially posed picture of a man holding a meeting with himself demonstrates the plight of Edward Marder, vice president of Ekco Products Co. He represents the housewares industry on six National Production Authority Industry Advisory Committees. He's a member of committees representing producers of stainless steel cooking utensils, tinware, cutlery, kitchen tools, stainless steel flatware and flashlights. What's more, he is a member of the OPS Stainless Steel Cooking Utensil Advisory Committee.

We note that he's smiling in some of the poses above. We don't know how he does it.

Golden Scrap

Iron and steel scrap is getting to be as valuable as gold, and far less plentiful. How the situation in scrap got that way and what can be done about it will be described next week, July 23, in a study STEEL is working up as its contribution to the scrap drive.

Many companies are doing their part to speed the flow of the material, among them Luria Brothers & Co. Inc. Luria has prepared a 22 x 28 inch full color poster to remind generators and users of scrap that it is needed. Copies of the poster are available without charge. Write us or Luria Lincoln Liberty Bldg., Philadelphia 7, Pa.

Now We Know

Great Britain's Health Act defines "infectious disease" this way:

"The expression 'infectious disease' means primarily any disease included in regulations under Subsection 1 of Section 29, whether absolutely or by definition of a particular stage of such disease, but in any Section of Part IV of this Act from the application from which a disease or a stage of a disease is excluded under Subsection 2 of said Section 29, the expression does not include such disease or such disease in such stage, as the case may be."

The Life

If we had it all to do over again, we'd aim at a career on Great Lakes freighters. No work in the winter; when you do work, a life in the invigorating lake atmosphere that thousands of people pay good money each year to be near during vacations.

And now comes the clincher. Pittsburgh Steamship Co. is installing powerful television receiving sets on each of the ore carriers in its fleet for the benefit of the crew.

Puzzle Corner

You have an infinite number of answers in July 2 problem. Al, Bill and Charley can have monies in the proportion of 5-11-13, with the watch 17. The watch costs any multiple of 17 cents. Thus, Al can have $5, Bill $11 and Charley $13. The watch would then cost $17. First in with replies to point that out were James C. Bramham of Meadows Mfg. Co., C. E. Norton of Highland Park, Ill., L. W. Davis of the Fort Worth District of the Corps of Engineers and Ralph Pappenheimer of Specialty Device Co.

Joe rowing downstream drops his hat into the water. He continues rowing downstream for 15 minutes and then decides to return for his chapeau. He recovers the hat one mile downstream from the point he originally dropped it. Neglecting the time required for turning the boat around, figure how fast the stream is flowing.

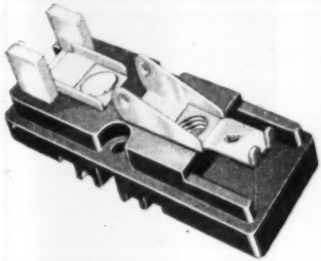
Shrdlu

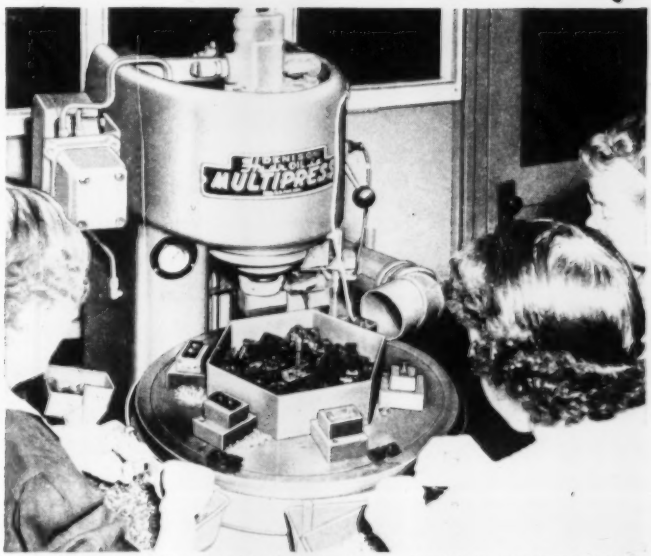
(Metalworking Outlook—Page 33)

Pays 400% return annually

Penn Electric Switch Co. cuts production costs $11,549.00 per year with this automatic

MULTIPRESS





Penn Electric Switch Co., Goshen, Indiana, Manufacturers of Automatic Controls.

Saves $7,345.00 per year in scrap losses alone.

Doubles production—to 400 units per hour.

Combines production of two types of switches in continuous 5 to 1 ratio.

Staking five metal parts in a bakelite base with each ram stroke, the Multipress above cuts scrap losses more than 80 per cent, and speeds production to twice the former rate without additional labor time.

Added together, these savings on scrap and labor bring Penn Electric Switch Co. a yearly gain equaling *four times the cost of the complete Multipress, accessories, and tooling.*

Operators prefer the Multipress, too, because it's so much quieter, safer to work on, smoother in action, and easier to operate than the previous press equipment.

The Multipress is a 4-ton model with a six-station Multipress Indexing Table. Operators simply place the magnetic switch parts in holding fixtures at each of the six stations.

The Multipress ram delivers exactly the same pressure with each stroke—a major advantage of its oil-smooth hydraulic action that plays a big part in the reduced scrap losses. This avoids damage to bakelite bases that run thicker than average, and prevents loose fittings on bases of less than average thickness. Ram tooling also features an equalizing head that assures uniform pressure on the two punches, thus permitting dual staking on each ram stroke.

A cam track inside the table housing lifts the staked parts out of the fixtures, and an air ejector blows them into a stove-pipe chute that carries them to the next operation.

This is another fact-proved story of some of the phenomenal results manufacturers in every field are getting with Multipress — on an extremely wide range of production jobs. Write for full details today.

MULTIPRESS is available in 8 frame sizes—1 to 50-ton capacities

Also standard Multipress accessories for many special needs. Manual, push-button, or, automatic control. Wide choice of ram actions. Tooling and fixtures designed and built to your needs, if desired. Write for details.

The DENISON Engineering Company

1163 Dublin Road, Columbus 16, Ohio

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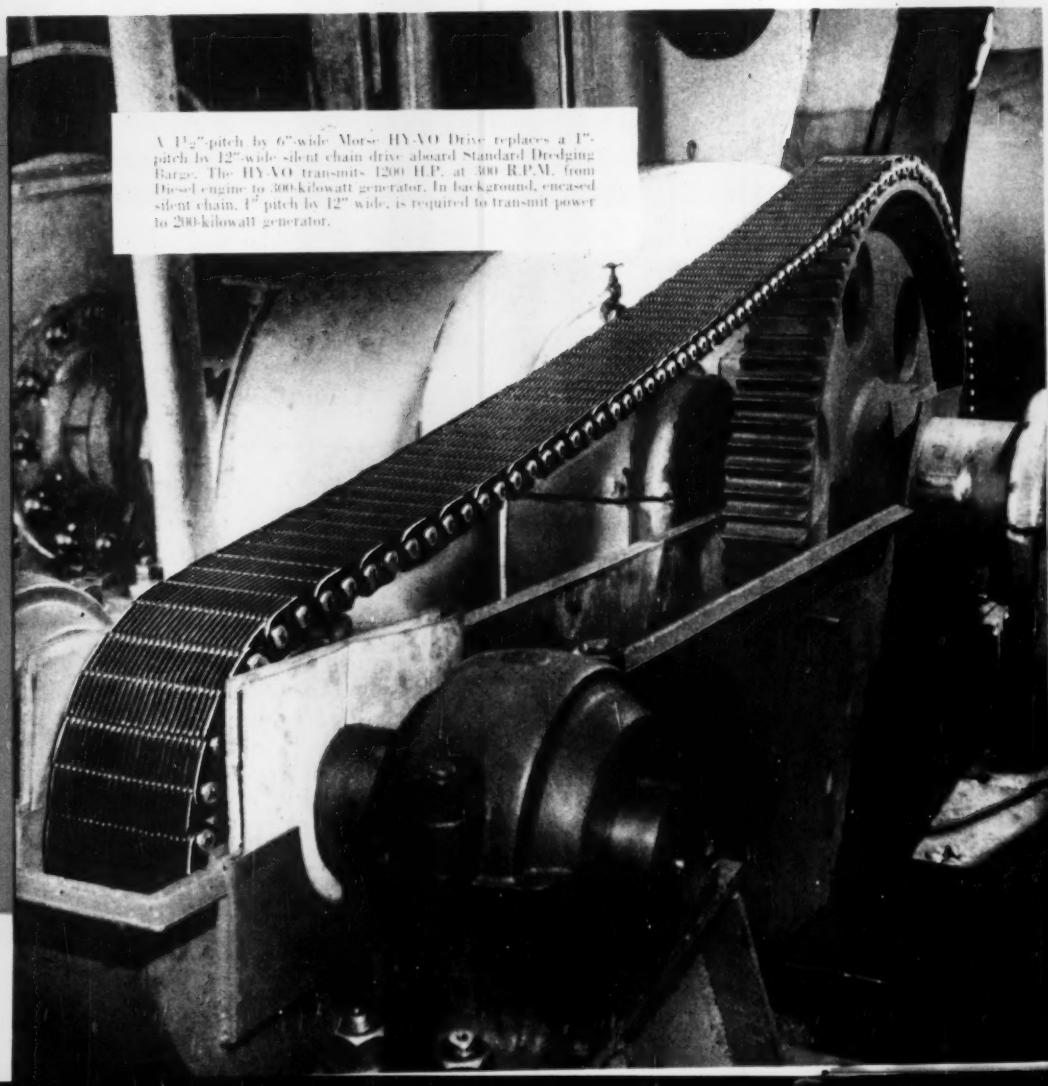
Now—
more than ever

M=PT

Morse means
Power
Transmission

Sensational, new transmits up to

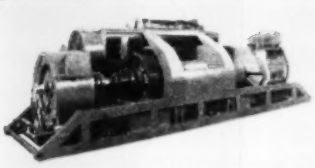


A 1½"-pitch by 6"-wide Morse HY-VO Drive replaces a 1"-pitch by 12"-wide silent chain drive aboard Standard Dredging Barge. The HY-VO transmits 1200 H.P. at 300 R.P.M. from Diesel engine to 300-kilowatt generator. In background, encased silent chain, 1" pitch by 12" wide, is required to transmit power to 200-kilowatt generator.

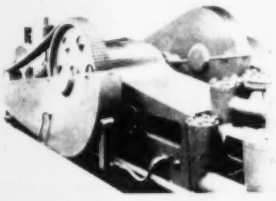
Morse HY-VO Drive

"TRADE-MARK"

5000 hp at 1200 rpm!



Designers said it couldn't be done. But Morse HY-VO Drives of just 2" pitch by 12" width transmit 1500 H.P. at 600 R.P.M. in this *portable* Emsco oil field drawworks.



Emsco mud pumps, used in conjunction with drawworks above, have 1½"-pitch by 8"-wide Morse HY-VO Drives transmitting 765 H.P. at 1120 R.P.M.

A 1½"-pitch by 3"-wide HY-VO Drive on irrigation pump of Joe Summers & Co. in Mission, Texas, transmits 300 H.P. at 514 R.P.M., *with chain velocity of 1600 F.P.M.*, continuously during irrigation season.

Velocities up to 6500 F.P.M.!

The sensational new Morse HY-VO Drive transmits more horsepower at higher speeds and lower cost than any other type of drive. It combines for the first time the strength and positive action of a gear, the smoothness and flexibility of a belt with the efficiency of a chain.

A far narrower HY-VO Drive can operate at vastly increased speeds—at top efficiency, in less space, with reduced heating and noise. The HY-VO can cut cost-per-hour of power transmission as much as 50%, and add up to one-third more service life.

The Morse HY-VO Drive opens the way for transmitting greater horsepower from smaller, more economical high-speed engines. (Case histories here show you some of the amazing accomplishments of HY-VO Drives.)

For more complete HY-VO Drive information, write for Catalog No. C 72-51 today. (Orders for HY-VO Drives must carry priority rating at present time.)

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POWER TRANSMISSION
PRODUCTS

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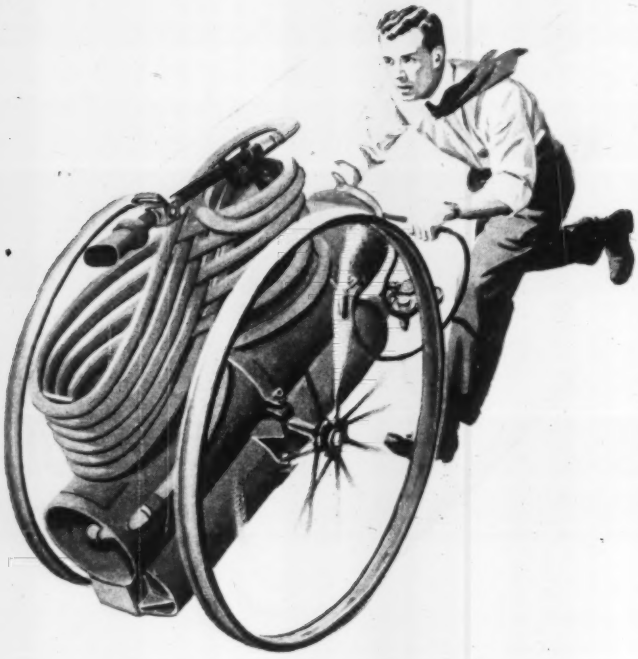

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—the Kidde Wheeled Dry Chemical Extinguisher

You *can* control a roaring fire in inflammable liquids, live electrical equipment, textiles or L-P gas. The Kidde 150 Pound Dry Chemical Wheeled Extinguisher packs a fire-fighting wallop that brings large fires under control quickly and easily.

The new "instant flow" hand control enables you to beat back fire with a long range "straight" stream . . . or to blanket the fire completely by the wider coverage of the improved "fan" pattern.

One man can wheel this extinguisher through a standard doorway . . . apply 150 pounds of fire-smothering dry chemical in less than one minute.

Write for full information on this new Kidde dry chemical extinguisher . . . or the full line of Kidde extinguishers and built-in systems.

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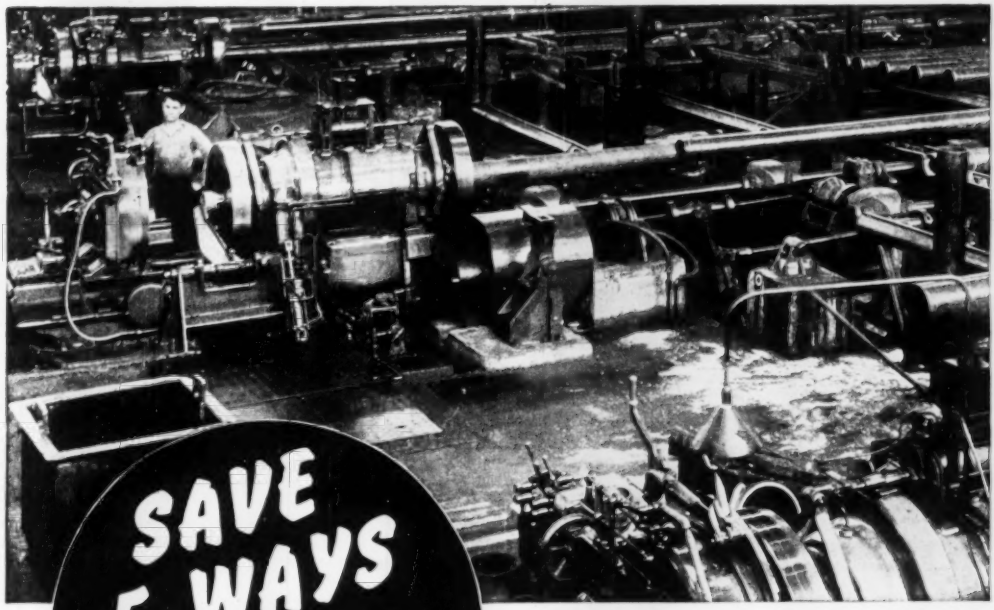


SAVE 5 WAYS on Pipe Threads

- FEWER MACHINES
- LOWER TOOL COST
- LOWER TOOL INVENTORY
- LESS SET-UP TIME
- HIGHER PRODUCTION

In tightening markets, Landis Pipe Threading Machines offer wide-open opportunities to cut production costs of pipe threads.

Three sizes of Pipe Machines will handle all diameters of pipe from ¼" to 18". Each die head is constructed to handle a wide range of pipe sizes —for example the 6" machine will thread all diameters from 1" to 6". Universal size adjustment allows quick set-up. Thus, a few machines will handle the complete range.

Die heads employ Landis Tangential Pipe Chasers. Interchangeability of the chasers further increases the versatility of these machines. The same chasers may be used for all diameters of threads within the range of a given die head providing that the pitch, form, and taper remain the same, thus reducing tool inventory. Chasers need be replaced only one at a time as needed. Chasers last longer since 80% of their length may be reground as the cutting edge dulls. Line contact with the work reduces friction and chaser wear, allows use of higher cutting speeds, and reduces chaser breakage.

A separate type of machine, the Receding Chaser Pipe Machine, is especially designed to handle A.P.I. Tapered Pipe Threads. Chasers recede into the head at a rate equal to the taper of the thread, ensuring accurate and uniform taper along the full thread length. This mechanism allows the use of smaller chasers, lowering tool cost and dollar tool inventories. Leave-off marks are eliminated by this receding action.

Investigate how Landis Pipe Machines can reduce direct tool cost, increase daily production, and reduce investment in tool inventory and heavy machinery. Write for specifications and further information.

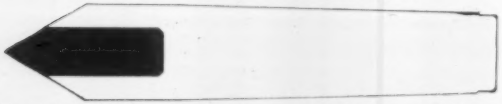
LANDIS Machine COMPANY
WAYNESBORO PENNA., U.S.A.

Gorham "M-40-U" ALLOY CENTERS
LAST THREE TO TEN TIMES LONGER

Here's a center that outlasts high speed steel and other ferrous and non-ferrous alloy centers from 3 to 10 times before it shows wear—and you can re-dress it countless times!

"M-40-U" is a special alloy developed by Gorham expressly for use as a wear, heat and abrasion-resistant metal. A core of this material is induction brazed in the steel shank of the center, after which the entire center is finish ground. Thus, the wear material is always supported by the tough shank steel throughout the life of the center. These centers require only a cleanup grind when wear finally occurs, and many cleanup grinds can be made without loss of wear-resistant properties, since the "M-40-U" alloy is actually a *deep core*, rather than a clad or applied *tip*.

NOT JUST A *CAP* NOT JUST A *TIP*



But a *long, solid core* that you can re-dress many times—and get a good-as-new center every time!

This Gorham center folder gives full description, dimensions and prices. Send for your free copy today.

Gorham "M-40-U" Alloy Centers and Half-Centers are available for immediate delivery. Morse, Jarno or Brown & Sharpe taper shanks, all popular sizes in stock, "specials" to your specification. Put an "M-40-U" Alloy Center on every lathe, automatic and grinder in your shop—watch them pay for themselves in down-time saved, *PLUS* the precision production you get with centers that stay true longer.

Gorham TOOL COMPANY
"EVERYTHING IN STANDARD OR SPECIAL CUTTING TOOLS"
14401 WOODROW WILSON • DETROIT 3, MICHIGAN

LETTERS
TO THE EDITORS

A Question of Dates

So we can arrange our 1952 convention time with a minimum of conflict with other societies, please send us a list of meetings scheduled for April, May, June and July, 1952.

American Society for Quality Control
c/o R. E. Wagenhals
Timken Roller Bearing Co.
Canton, O.

• *We are sending the list as far as we have it. Many associations have not yet established the dates of their 1952 conventions.*

Materials Handling in Miniature

Under the headline, "No Jigsaw Puzzles," (STEEL, June 25, p. 109) you mention a kit which helps to work out a materials handling problem in miniature form. Can you advise us whom to contact for additional information concerning these kits?

R. A. Goldschmidt, manager of sales
Electrical & Wire Rope Division
Tennessee Coal, Iron & Railroad Co.
Birmingham, Ala.

What company makes the plastic surface planning board and accessories as noted under STEEL's "No Jigsaw Puzzles?"

W. H. Emory Jr.
Klug & Smith Co.
Milwaukee

• *Name of company making these kits is Triometric Inc., 711 Penn Ave., Pittsburgh. The planning boards come in three sizes: $10; $17.50; and $27.50.*

Scrap Hunt Continues

We are completely re-working our foundry dump to remove its metal content. Approximately eight acres are involved. Do you have any record of firms engaged in salvage operations of this kind?

R. C. Sundquist, treasurer
Lakey Foundry & Machine Co.
Muskegon, Mich.

• *One such company is Heckett Engineering Corp., Butler, Pa. The firm has been engaged in salvaging metal from steelworks dumps for more than a decade.*

Asking About Axles

Please explain the meaning of STEEL's market quotation on axles. Are they destined for railroad passenger or freight train cars, or for motor cars? Are they forged and rough-turned, or finished machined?

Dr. H. Neibuhr
Essen-Bredeney
British Zone, Germany

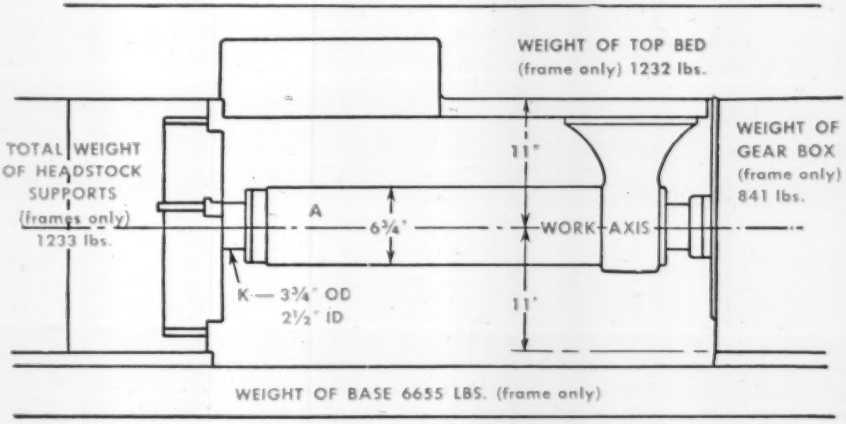
• *Axles quoted are those made for passenger or freight cars operated by American railroads. They are forged at the mill and finished machined at both ends ready for the bearings before shipment.*

Interest in Vermiculite

Who makes vermiculite, the mineral described in STEEL, June 25, p. 109?

W. O. Kugler
Pressed Steel Tank Co.
Milwaukee

• *Zonolite Co., 135 S. LaSalle St., Chicago.*



MAKER OF "HISTORIES"

The above drawing illustrates a Tooling Area that has staged many outstanding cases of machine adaptation and performance. Case histories are very useful as examples of machine adaptation, but their blanket use as unqualified proof of dependable performance is not convincing.

Buyers know that varying requirements and conditions of various plants make "buying what the other fellow buys" an unsafe practice. They know that good case histories will result if machine facilities have been properly selected. No plant could long afford to have it otherwise.

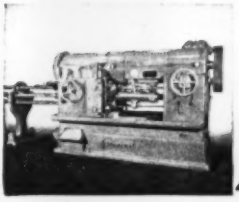
A "top performer" of the 1½" SIX SPINDLE CONOMATIC TOOLING AREA, shown above, is the MAIN END SLIDE. The specific data given tells why:

1. **It has a greater maximum load recommendation and a stronger frame support than the main end slide of any other "automatic".**

The 272 lb. alloy carburized steel Main End Slide, A, is 33⅝" long, and has a maximum load recommendation of 4800 ft. lbs. Its round surface is machined to close limits. It is supported in nickel iron, split, sleeves on the alloy steel Way, K, with a total bearing of 136.9 sq. ins.

2. **It handles more work; has more adaptable tooling positions, and more selective feeds, than the main end slide of any other "automatic".**

The 27⅞" tooling-length of the Slide handles shaft jobs up to 18" in length. The 2⅝" swing clearance permits die-head threading to full machine capacity in any, or all, six positions without Slide alteration. Nine pairs of pick-off gears give 68 feed changes for each work spindle speed.



Buyer's Comparison Chart will guide you to full information

A Comparison of ALL Automatics is in Favor of Cone

Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC.
WINDSOR, VT., U.S.A.

Republic Tips

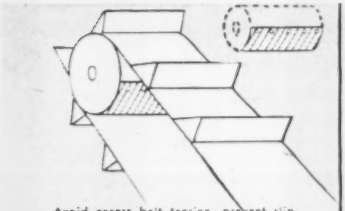
TO ELEVATOR BELT USERS

● With Republic Elevator Belting on the job, you're set to handle bigger pay loads with less trouble.

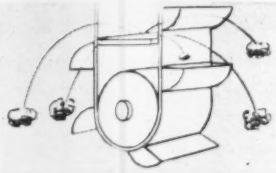
Don't lose this advantage by improper methods of application and maintenance!

Your local Republic Rubber Distributor can show you many ways to improve efficiency and increase service life of elevator belts. As an experienced specialist, he is fully prepared to help you select exactly the right Industrial Rubber Product for your requirement. Contact him today.

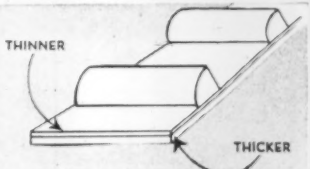
Remember, Republic Rubber has been *the* specialist in the field of Industrial Rubber Products for more than 50 years. Use Republic products and you use the best. Use Republic products *correctly* and you save the most!



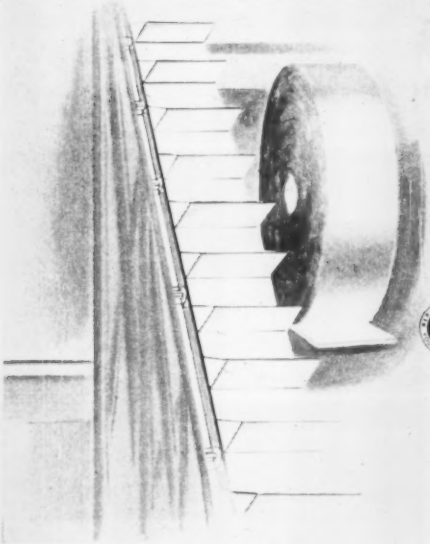
Avoid excess belt tension, prevent slippage and minimize wear on belt pulley cover by lagging the head pulley.



Shield foot pulley with sloping deflector to prevent falling material from jamming or punching holes in belting.



Elevator belt wear is severest on the pulley side rather than the bucket side. Therefore Republic belts have extra thick covers at points of greatest wear and are plainly branded "Bucket Side" for proper installation.



stop costly breakdowns with REPUBLIC ELEVATOR BELTING!

Republic Elevator Belting is built to keep moving under the most grueling working conditions.

Made in fold-edge construction with multiple plies of heavy, prestretched rubber-insulated fabric, Republic Elevator Belting is specially designed to resist bolt pull at the buckets.

Tough abrasion-resistant black rubber covers give belt carcasses maximum protection . . . stand up longer under more severe service requirements.

Republic Elevator Belting is supplied in all standard widths and plies. All fabrics are permanently treated against mildew.

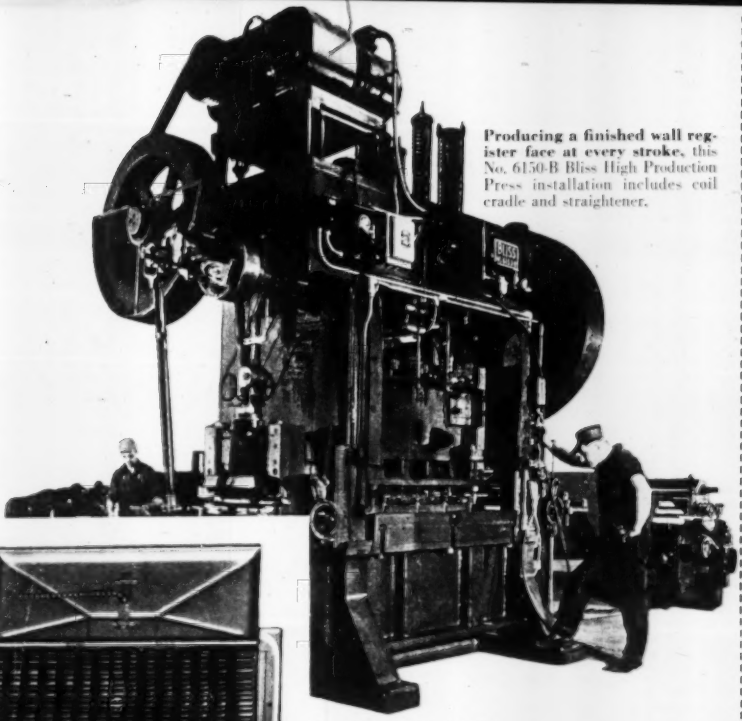
See your local Republic Distributor or write direct for full facts.

INDUSTRIAL RUBBER PRODUCTS BY

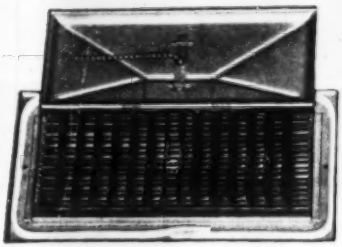
REPUBLIC RUBBER DIVISION

Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO



Producing a finished wall register face at every stroke, this No. 6150-B Bliss High Production Press installation includes coil cradle and straightener.



Lima register—available in wall and floor types—various sizes.

5 Bliss Automatic Presses at Lima Register Co. equal output of 65 hand-fed

COST OF VALVE IS 1/25th THAT OF HAND-FED PART

It's a fact! In choosing equipment and methods to produce stampings for the famous Lima Register, Bliss and Lima engineers agreed that 5 Bliss presses set up for automatic operation would equal the output of 65 hand-fed presses.

Now, 18 months later, the plant is in full production and the 5 Bliss presses are turning out all the stampings required.

Two Bliss High Production Presses with progressive dies and Bliss coil cradles handle the bulk of the production. Stamping runs of 15,000 or more are assigned to these presses. Bliss Inclinable Presses with roll feeds are exactly suited for the production of a variety of small-lot stampings.

An example of the unusual savings achieved by Lima is the floor register valve. Formed complete—80 a minute—in a Bliss No. 675 High Production Press, it costs only 1/25th of a hand-fed stamping.

Similarly, high savings are obtained on all stampings produced on Bliss automatic presses.

If your stamping runs are 50,000 or more ask Bliss engineers how High Production Presses can increase your profits. Your nearest Bliss representative will be glad to talk about converting your hand-fed stampings to automatic operation.

E. W. BLISS COMPANY, CANTON, OHIO

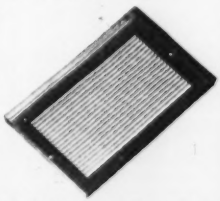
Valve for floor register...80 per minute...20 gauge steel...675 Bliss High Production Press.

Body slide...80 per minute...20 gauge steel...675 Bliss High Production Press.

Short border...75 per minute...16 gauge steel...6150 Bliss High Production Press.

Sliding channel...100 a minute...20 gauge steel...675 Bliss High Production Press.

Hinge angle...100 a minute...20 gauge steel...675 Bliss High Production Press.



Cold air face...40 a minute...blanked on 6150 Bliss High Production Press; formed on 21½ Bliss Inclinable Press.

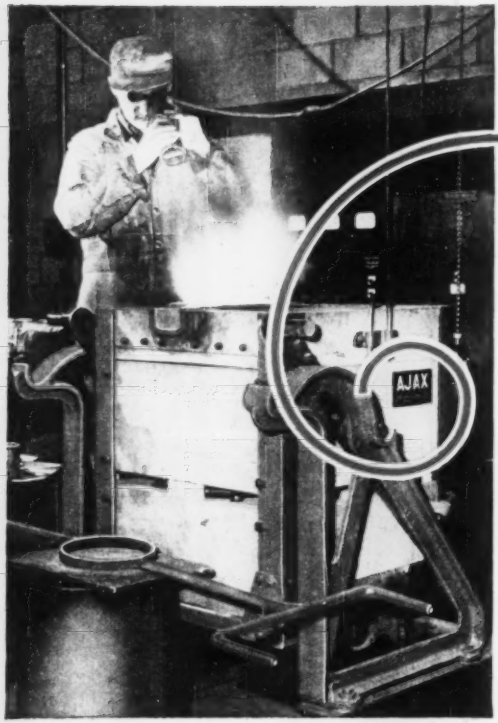
Chain clip...100 a minute...24 gauge steel...Bliss 21-B Inclinable Press.

BLISS BUILT

FROM THE RIGHT PRESS FOR A GIVEN JOB

...TO A COMPLETE PRESS ROOM...

It's Bliss



Casting Precision

STARTS IN THE MELT with

AJAX-NORTHRUP INDUCTION FURNACES

The precision that distinguishes fine castings must *start* in the melt . . . in precise control of composition, in accurate pouring temperature. The kind of control that only one furnace can provide . . . the Ajax-Northrup high frequency furnace. Take a look at the facts:

Speed: Speed is a function of power. Furnaces may be overpowered for extremely fast melting . . . normally or underpowered where slower melting schedules are permissible.

Analysis Control: In melting high alloy steels, alloying elements often can be kept within 0.25% of desired composition, carbon within 0.01 or 0.02%. Excellent, too, for "fussy" non-ferrous alloys. Because it stirs as it melts, you get uniform results heat after heat.

Economy: Fast melting minimizes oxidation, prevents loss of valuable alloy constituents, prolongs refractory life. It's the most economical way to melt metals high in chromium, nickel, tungsten, etc.

Flexibility: Makes no difference what metals you melt or what quantities . . . Ajax-Northrup's precision, speed, easy control, and flexibility in linings permit you to cover emergencies, meet almost any production schedule. Just name your alloys and quantities, and we'll send you the proper technical bulletins.

AJAX ELECTROTHERMIC CORPORATION

AJAX PARK • TRENTON 5, N. J.

Associate Companies

AJAX ELECTRO METALLURGICAL CORP.
AJAX ELECTRIC FURNACE CORPORATION
AJAX ELECTRIC COMPANY, INC.
AJAX ENGINEERING CORPORATION

126

AJAX HEATING & MELTING

One way to lick shortages of both men and machines

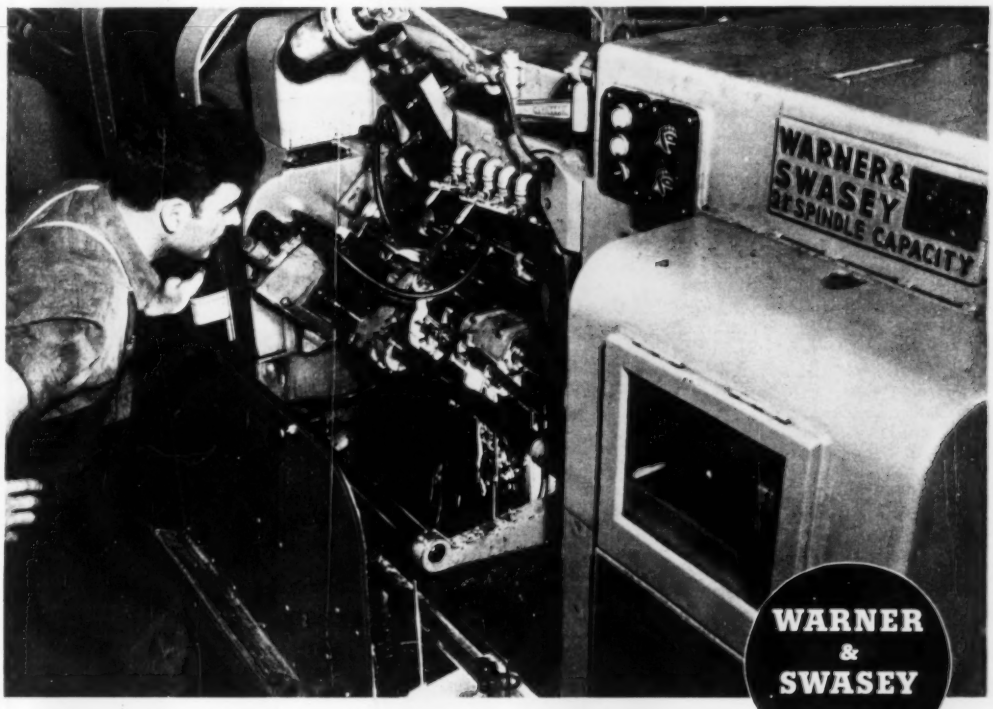
● If yours is like many companies, you need to buy new machine tools and hire new men—both scarce—to meet today's huge production demands.

The new Warner & Swasey automatics are designed to help you solve both of these problems.

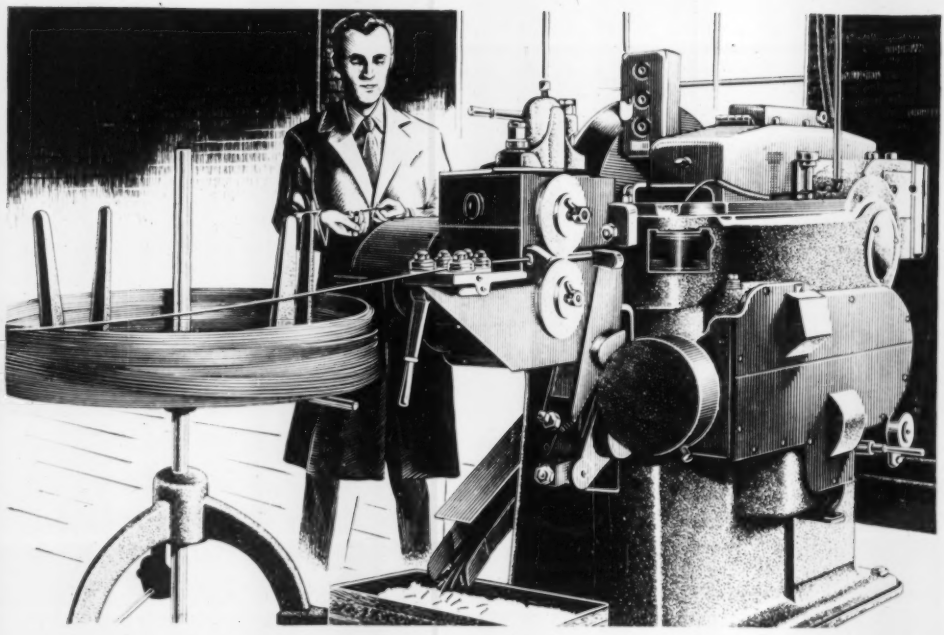
These automatics—either single or 5-spindle machines—are ideally suited for certain types of work, even in small or medium lot runs. In your plant, one or two automatics very possibly can take the place of as many as five hand-operated machines. Savings in investment and floor space are obvious.

And one man can generally operate two or more automatics. This fact, coupled with the greater capacity of each automatic—from two to five times that of a hand-operated machine—can step up his productivity tremendously.

So when you need new machine tools, don't simply reorder on the basis of previous experience. Talk it over with your Warner & Swasey Field Engineer. He may again recommend turret lathes, but perhaps he'll show you how you can do your particular job better and more profitably with automatics.



YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS AND TAPPING MACHINES



Get maximum output with Scovill extruded cold-heading wire!

Uniformity and soundness are the basic reasons why Scovill *extruded* cold-heading wire (cartridge brass, 70%) goes further.

This wire is hot extruded from billets which are made by Scovill's unique *continuous-casting* process to secure maximum uniformity of composition and freedom from internal defects. Scovill's precision drawing and annealing operations assure uniformity of finish wire tempers to suit your specific cold-heading applications.

You save labor . . . uniformity means no tool re-setting during runs. You save brass . . . uniformity means accuracy, no waste. Faulty cold-heading, due to the material used, is at a minimum when you use the proper temper of Scovill *extruded* cold-heading wire. No split heads or shanks, out-of-round heads, scanty filling-out of heads and shoulders, or rough "orange-peel" effect.

Credit this fine wire to Scovill's foresight after World War II in modernizing its Wire Mill. Though Scovill's capacity is increased, so is demand . . . at a time when raw-materials (copper, zinc, etc.) are relatively short.

While you can't always get Scovill *extruded* cold-heading wire, when you do, you'll find "You Can't Buy Better Brass." It assures maximum output of cold-headed brass parts from uniform wire with your required "flow" characteristics (for heading and extruding) or of essential rigidity (for heading and drilling).

"You can't buy better brass"

SCOVILL

A PRODUCT OF SCOVILL

For complete information, contact: **SCOVILL MANUFACTURING COMPANY,** 83 MILL ST., WATERBURY 20, CONN.

BRASS MILL PRODUCTS IN A COMPREHENSIVE RANGE OF COMMERCIAL ALLOYS, SHAPES, TEMPERS AND SIZES

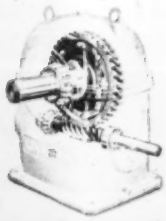
Speed reduction problem?

Is it Ratio? Space? Shock? Overload?

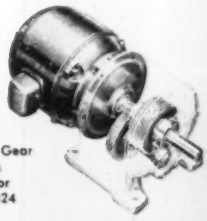
No *one* speed reducer solves *every* reduction problem. That's Why LINK-BELT Builds All THREE.

FOR the *right* speed reducer engineered to match your exact conditions, your best bet is Link-Belt. Link-Belt builds all three—Gearmotors, Herringbones, Worms. When a Link-Belt power transmission engineer analyzes your problem, he isn't tempted to fit his recommendations to a limited line.

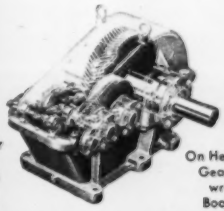
You can also be sure that the Link-Belt unit recommended is engineered and built for tough operating conditions. And efficiency in power transmission is matched by flexibility in application!



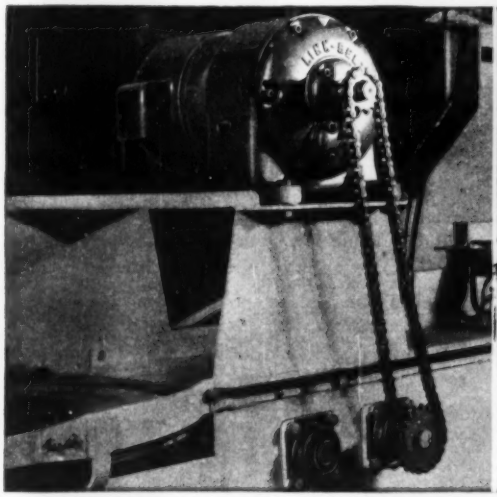
On Worm Gear Drives write for Book 2324



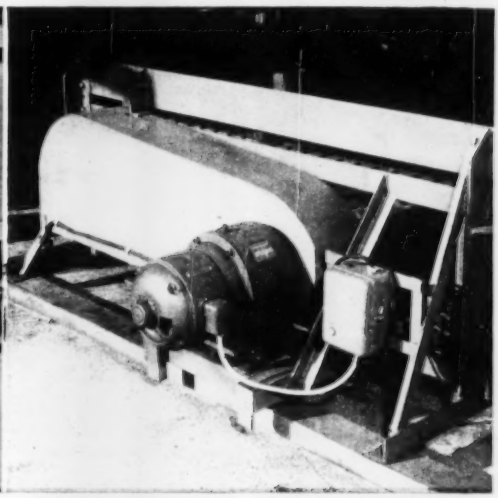
On Gearmotor and Helical Gear Drives write for Book 2247



On Herringbone Gear Drives write for Book 2419



Link-Belt 1 hp Gearmotor, conveniently mounted, operates a revolving plate disc used in manufacturing tin cans. Note also Link-Belt Roller Chain and Roller Bearing Flanged Block.



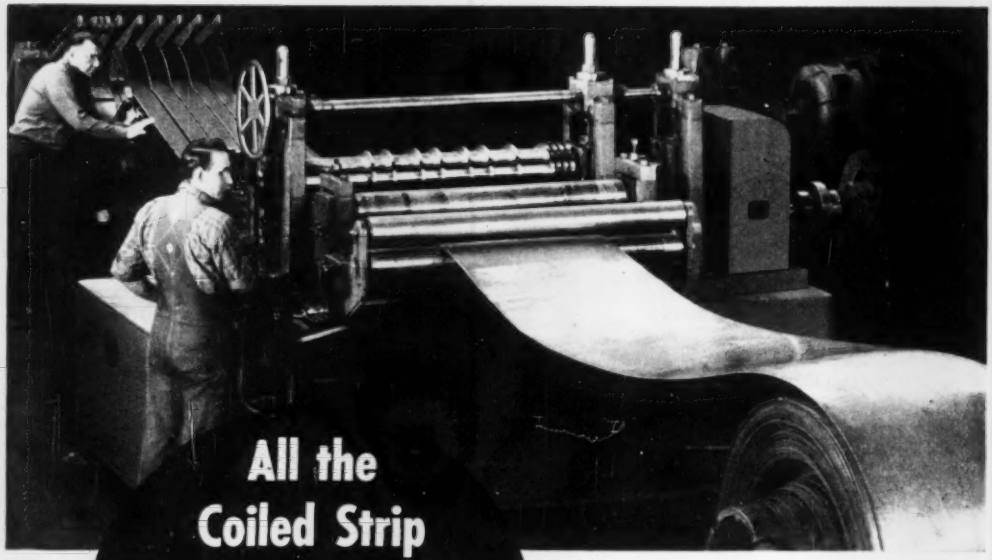
Conveyor section of a railroad tie doweling machine driven by a compact Link-Belt 2 hp Gearmotor through an enclosed Link-Belt Precision Steel Roller Chain Drive.

LINK-BELT

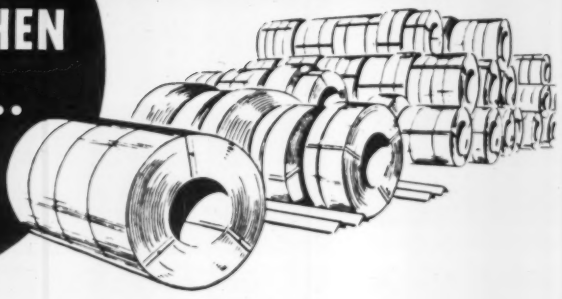
ENCLOSED GEAR DRIVES

12,242-A

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities.



All the Coiled Strip You Need...WHEN You Need it... At LOWER COST!



You will find it ever so much easier to have all these things when you install a Yoder Rotary Slitter. The sources of supply of mill-width stock are obviously much more numerous, prices per ton much lower, and deliveries much quicker than on slit-to-width strands.

Not only that, but your stock becomes more flexible—goes farther—when mill-widths can in a few hours be slit to the desired widths in your own shop. Many fabricators have reduced inventories from 40 to 60% by investing in a Yoder slitter.

Production planning becomes easier, too, when expected and unexpected needs for any width can be so quickly and easily met.

Besides all these advantages, direct savings may range from $5.00 to $50.00 per ton, depending on widths, quantities and other factors. On requirements as low as 1000 tons per year, a Yoder slitter often becomes a most profitable production tool. Get the facts! Send for 78-page book on the Economics as well as the Mechanics of doing your own slitting.

THE YODER COMPANY • 5502 Walworth Avenue • Cleveland 2, Ohio

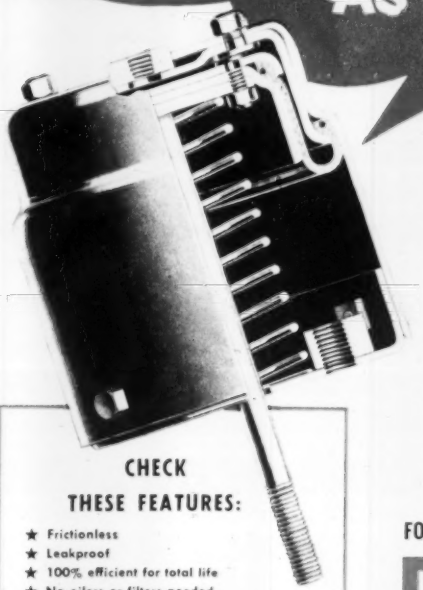
Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS–cold forming and welding

ENGINEERING YODER MANUFACTURING

ON OLD OR NEW MACHINE TOOL OPERATIONS—

YOU CAN STEP UP YOUR PRODUCTION AS MUCH AS 30%



....WITH THIS SIMPLE, RUGGED, LOW COST AIR CYLINDER!

The pressure for production is on! Manufacturers everywhere find it increasingly difficult to keep pace with the demands of the day. But there is a way—a brand new way requiring no addition to manpower, no addition to plant facilities. The answer? Remarkable Bendix-Westinghouse Robotair Industrial Controls. With their wide range of applications, Robotair controls offer you amazing improvements in production speed and economy through increased productivity of man and machine at *unbelievably low initial cost*. Robotair units are available as original equipment for machinery manufacturers or for easy installation on shop equipment.

Send today for an informative booklet and find out how you can cut costs, speed production with Robotair! Address Bendix-Westinghouse Automotive Air Brake Co., Dept. G, Elyria, Ohio.

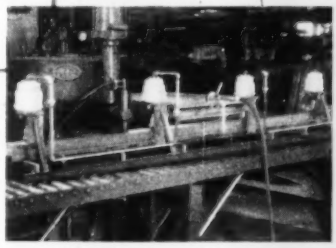
CHECK THESE FEATURES:

- ★ Frictionless
- ★ Leakproof
- ★ 100% efficient for total life
- ★ No oilers or filters needed
- ★ Holding pressures up to 5000 lbs.
- ★ Diaphragm has rolling action and exceptionally long life
- ★ Made from high grade steel stamping—all metal parts cadmium plated
- ★ Chrome Molybdenum Steel Push Rod heat-treated for maximum toughness
- ★ Easily installed

FOR HOLDING, CLAMPING, BENDING, SWEDGING, STAKING, RIVETING

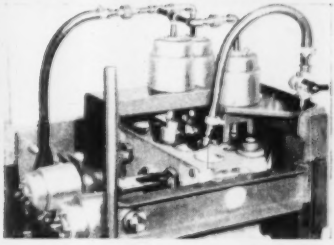
ROBOTAIR

THE INDUSTRIAL AIR CONTROL OF A THOUSAND USES



REDUCES OPERATOR FATIGUE

Four Rotochambers installed on the fixture in this spot welding operation replaced cumbersome hand clamps, saving time, greatly reducing operator fatigue.



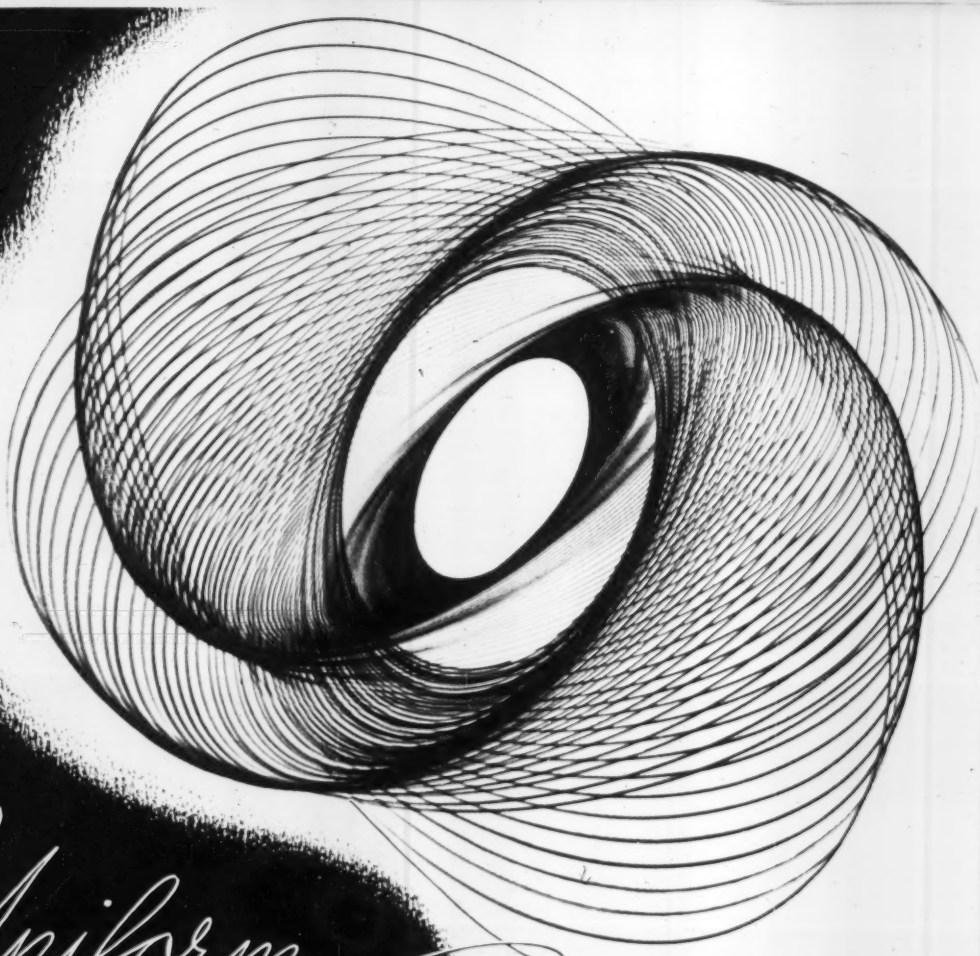
SPEEDS INSPECTION METHODS

Installation of Rotochambers on this water test operation for engine castings eliminated hand operated fixtures, thereby speeding inspection and cutting costs.

BENDIX-WESTINGHOUSE ROBOTAIR

Bendix-Westinghouse

Bendix-Westinghouse Automotive Air Brake Company Elyria, Ohio



Uniform

for precision forming and coiling

Pittsburgh Oil Tempered Spring Wire

Your precision forming and coiling operations will be easier, more economical, with Pittsburgh Oil Tempered Spring Wire because it has the uniformity to give you trouble-free performance day after day. Severe bends are easy—it withstands high stresses and resists wear and abrasion.

Each coil of Pittsburgh Oil Tempered Spring Wire has uniform qualities of toughness, tensile strength, reduction of area, and hardness plus superior straightness that will give you ease of operation and excellent finished products.

Pittsburgh Oil Tempered Spring Wire is furnished in a complete range of sizes from .062" through .500" diameter. For information write department S, Pittsburgh Steel Company, Pittsburgh 30, Pa.

The Steel Industry Needs Scrap—Keep it Moving

Pittsburgh Wire

a product of Pittsburgh Steel Company

PLATEMANSHIP

H-VW-M's unique combination of:

. . . the most modern and complete laboratory for testing and development

. . . ability to provide complete equipment and materials for every plating and polishing need

. . . the complete background of knowledge and experience in every dispect of plating and polishing.

ONLY H·VW·M PLATEMANSHIP brings you the advantages of STAPLBOND BRUSH CONSTRUCTION . . .

. . . that provides rigid, strong, fibrous centers which combine economy with efficiency and durability

. . . that evenly distributes tampico fibre or wire around the hub and securely anchors it in position with a steel ring.

. . . that concentrically trims each section to insure perfect balance

. . . that enables H-VW-M to supply brushes that are exactly right for the service for which they are intended —brushes that turn in a consistently dependable performance over a longer period of time.

As specialists in meeting and anticipating the needs of the electroplating and polishing industry, H-VW-M can always be relied upon to supply the *right* brush for every job. Two all-inclusive lines are available . . .

StapLbond Tampico Brushes for the widest possible flexibility of application in metal cleaning and polishing. The use of *Acme* Emery Paste or Cake with them is recommended for polishing irregular steel surfaces; pumice or special compounds for producing a satin finish; cleaning solutions for brush cleaning all metals.

StapLbond Steel Wire Brushes for heavy brushing, cleaning, etc., on rubber, castings, gear teeth and for removing scale, rust and paint from metal surfaces.

H-VW-M supplies a complete line of brushes to meet all requirements—brushes which embody all the refinements of *Platemanship*—are designed for long, fully dependable service regardless of the task to which they are put. Detailed reasons why they are preferred are found in Bulletin BR-104. Send for it.

HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, NEW JERSEY

PLANTS AT MATAWAN, N. J. • ANDERSON, INDIANA • SALES OFFICES ANDERSON • BOSTON • CHICAGO CLEVELAND • DAYTON • DETROIT • GRAND RAPIDS • MATAWAN • MILWAUKEE • NEW HAVEN NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER • SPRINGFIELD (MASS.) • STRATFORD (CONN.) • UTICA

H·VW·M

8133

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

"Are Your Production Profits LOST in the Shipping Room?" ASKS NOTED INDUSTRIAL ENGINEER

"The attitude 'that the shipping room will take care of itself' has prevailed too long," writes Stanley Farwell, President of Business Research Corporation, pioneer management engineering firm, in a recent article.

Failure to apply to shipping room operations the methods and techniques used in manufacturing has been a costly oversight for many firms.

And, to make effective use of time and space, to capture *all* the profits of the production line, to reduce indirect labor charges, he recommends the use of power tools.

Many companies—*most* companies—that have modernized their shipping rooms use Delta tools. For any assignment in *your* shipping room—sawing, drilling, planing, jointing—they save you time and money.

Delta tools, plus modern layout and methods, are breaking month-end shipping room bottlenecks for many plants. Your Delta dealer will be glad to review your shipping room problems with you.

There's a Delta Power tool for your job....

WOOD OR METAL WORKING

53 MACHINES — 246 VARIETIES — MORE THAN 1300 ACCESSORIES

For Delta dealers, see your Classified Phone Directory under "Tools"

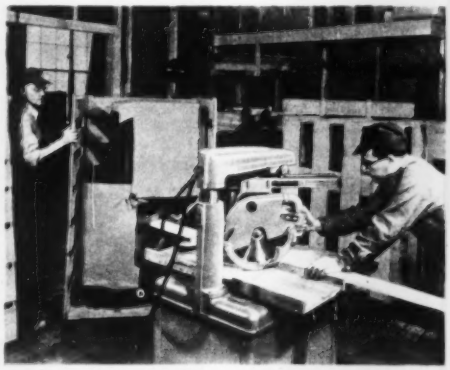
DELTA MILWAUKEE

DELTA POWER TOOL DIVISION

Rockwell MANUFACTURING COMPANY

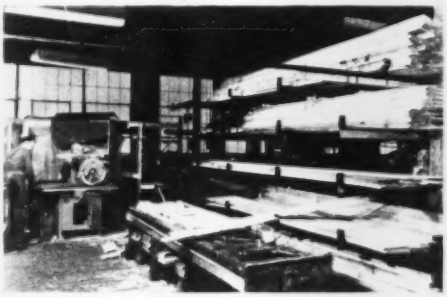
629G E. VIENNA AVENUE • MILWAUKEE 1, WISCONSIN

THESE COMPANIES CUT SHIPPING COSTS WITH Delta Tools



AMERICAN HOSPITAL SUPPLY CO., Evanston, Ill.

With one Delta radial arm saw the company does all sawing operations, reducing equipment costs and freeing more space for manufacturing operations. One less man is needed for most crating work. The versatile Delta saw is also ideal for many maintenance jobs.



YEOMANS BROTHERS COMPANY, Chicago

Installing a multipurpose Delta radial arm saw and repositioning lumber racks helped Yeomans Brothers Company, Chicago pump and sewage treatment system manufacturer handle boxing of equipment weighing 10 pounds to 8,000 pounds. Up went production, down went costs in the seven man department.

Christendom was saved by steel

ALL day long, waves of Arab horsemen beat upon the ranks of Charles Martel's veteran militia. But time after time, the enemy cavalry recoiled before storms of iron-tipped javelins, their shining scimitars unsuccessful. On the second morning, the Saracen leader, Abderrahman, was slain, pierced with many spears. The Moslem horde fled back across the Pyrenees, never again to menace the Western world.

Time after time, as at Tours in 732 A.D., Christian civilization has been threatened by seemingly invincible enemies. Yet history proves that victory invariably has gone to the nation or alliance which excelled in the production and use of iron and steel.

In the present era of alarms and crises, it is reassuring to realize that America has greater capacity for making steel than all the rest of the world combined. Furthermore, the American steel industry is expanding at a rate far faster than that of all the dictator-directed economies behind the Iron Curtain. Our free and independent steel making and metal working industries can and will forge sinews for the peace we want or for the war we may be forced to fight.

So remember this: It is not only the threat of Muscovy to fear—America has itself to fear also—its misguided sentimentalists, its sheltered saboteurs—who seem to play communism's game by frittering away our strength and our resources.

QUALITY YOUNGSTOWN SERVICE

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

CONDUIT - PIPE AND TUBULAR PRODUCTS - BARS - RODS - COLD FINISHED CARBON AND ALLOY BARS - SHEETS - PLATES - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - TIE PLATES AND SPIKES.

Is this clue to quality on your product?

PHILLIPS SCREW

THIS ADVERTISEMENT is part of the current campaign aimed at the 14 million readers of The SATURDAY EVENING POST.

BY USING PHILLIPS SCREWS on your product, you prove *on sight* that you use extra care in manufacture. The public knows that X marks the spot — the identifying X formed by the cross-recess on the head of every Phillips Screw. It is the mark of extra quality.

These screws — wood, machine or tapping — add structural strength, set up tighter, resist the loosening effect of vibration. They are speedier—and cost saving because they save time, work, money. They start faster, eliminate driver skids, damaged parts, split screw heads. They make good workers out of green help — fast!

Be sure to include Phillips Cross-Recessed-Head Screws in your specifications.

PHILLIPS *Cross-Recessed-Head* SCREWS

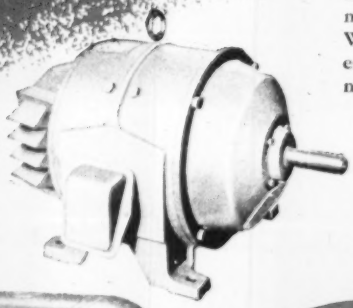
X *marks the spot . . . the mark of extra quality*

AMERICAN SCREW CO. • THE BLAKE & JOHNSON CO. • CAMCAR SCREW & MFG. CORP.
CENTRAL SCREW CO. • CONTINENTAL SCREW CO. • ELCO TOOL & SCREW CORP.
GREAT LAKES SCREW CORP. • THE H. M. HARPER CO. • NATIONAL LOCK CO. • PARKER-KALON CORP.
PHEOLL MANUFACTURING CO. • ROCKFORD SCREW PRODUCTS CO. • SCOVILL MANUFACTURING CO.
SHAKEPROOF INC. • THE SOUTHINGTON HDWE. MFG. CO. • WALES-BEECH CORP.

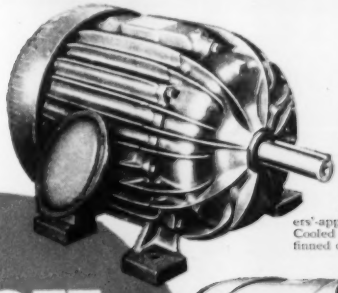
THE FASTENERS OF TODAY . . . AND OF THE FUTURE

Motors like these keep your production at the peak!

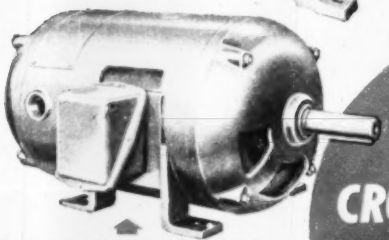
Select a motor that enjoys national acceptance, plus recognized quality. You'll find it in this complete line of integral motors from 1 hp up, with the backing of both Crocker-Wheeler and Elliott. Get double assurance of superb motor engineering and workmanship, and enjoy the speedy, top-notch service of an organization geared for fast action. Write.



D.C. dripproof and drip-proof-protected types Form F, in ratings to 7½ hp. Form H, 10 to 200 hp.

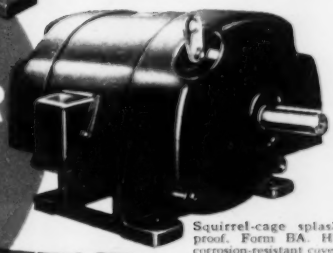


"Sealedpower" totally-enclosed fan-cooled squirrel-cage motors, 3 to 125 hp. Also explosion-proof underwriters'-approved, 20 to 125 hp. Cooled by air blown along the finned outer case.

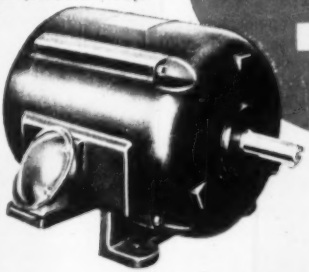


Wound-rotor protected type Form BW. For slow, smooth acceleration, high starting torque with low starting current, or variable speed. Drip-proof, splash-proof, 1 to 200 hp.

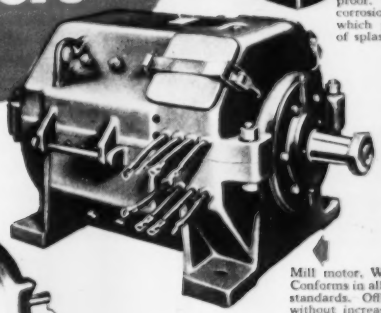
ELLIOTT
CROCKER-WHEELER
Integral
motors



Squirrel-cage splash-proof, Form BA. Has corrosion-resistant covers which prevent entrance of splashing liquids.

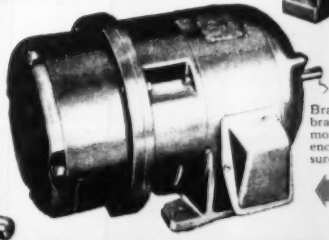


Squirrel-cage, totally enclosed, non-ventilated Form BE. Available up to and including 3 hp at 1800 rpm, for applications requiring protection against dust, fumes, moisture.

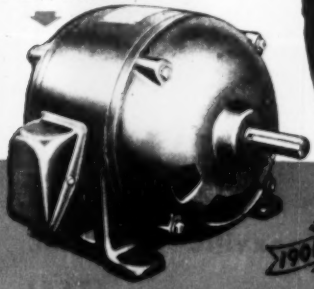


Mill motor, W600 Series, DC. Conforms in all respects to AISE standards. Offers more power without increase in frame size.

Squirrel-cage protected type Form BA. An open dripproof motor for general purpose use. Available in wide modifications to meet a variety of conditions.



Brake motor using latest disk type brake mounted on BA dripproof motor. Also available with totally enclosed and splashproof enclosures for AC or DC applications.



Above is a partial showing of the complete line. For descriptive bulletins, address Elliott Company, Dept. S, Jeannette, Pa.

CW 37

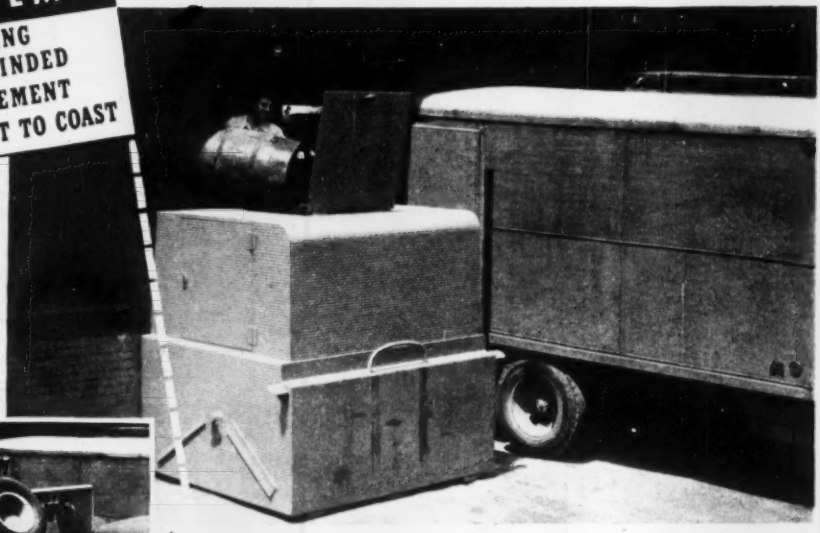
1901 Fifty Years of Progress 1951

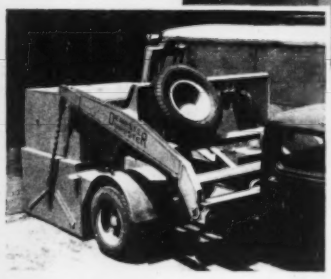
ELLIOTT COMPANY
Crocker-Wheeler Division • Ampere, N. J.
DISTRICT OFFICES IN PRINCIPAL CITIES

DEMPSTER DUMPSTER SYSTEM

SERVING COST-MINDED MANAGEMENT FROM COAST TO COAST

. . . handling bulk materials of every description at phenomenal savings





Photos show a Universal Type Container being loaded. Dempster-Dumpster ready to pick it up and place it in carrying position, and container being emptied. Entire operation is handled hydraulically by means of controls at driver's seat.

DOW CHEMICALS INDISPENSABLE TO INDUSTRY AND AGRICULTURE

-recognized across the nation

. . . The Dow Chemical Company, well known for sound management, uses the Dempster-Dumpster System

The Dow Chemical Company is among the hundreds of well managed manufacturers, both large and small, who use the Dempster-Dumpster System of bulk materials handling . . . the system recognized across the nation for its efficiency and ability to reduce costs.

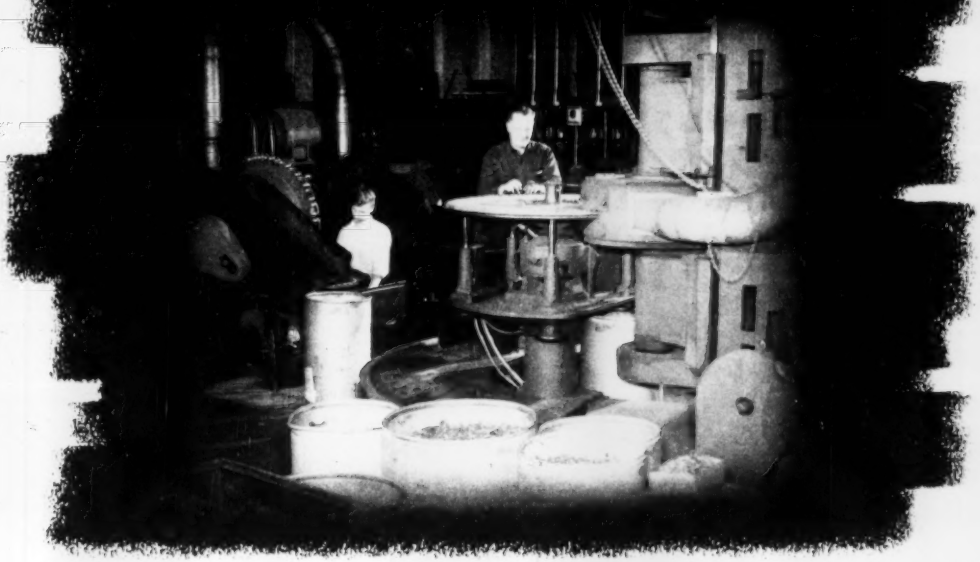
Increasing man-hour efficiency is one of the important advantages of handling bulk materials with the Dempster-Dumpster System. One Dempster-Dumpster, with only one man, the driver, services any number of detachable Dempster-Dumpster Containers, which are spotted at convenient materials accumulation points inside and outside plants. In this system there are no loading crews to stand idle while truck makes haul, and no re-handling of materials. Dempster-Dumpster Containers are available in a wide variety of designs and sizes, up to 12 cu. yds., to suit the type of materials handled—be they bulky, light or heavy . . . solids, liquids or dust . . . trash or rubbish. The Dempster-Dumpster System also reduces investment in equipment and maintenance costs . . . improves "housekeeping" methods . . . reduces fire hazards . . . and provides an easier, quicker, safer and more efficient manner of handling materials. It will pay you to investigate the Dempster-Dumpster System of plant materials handling now! Manufactured exclusively by Dempster Brothers, Inc.

One Dempster-Dumpster Services All Containers. . . All Designs. . . All Sizes

DEMPSTER BROTHERS, 671 Dempster Bldg., Knoxville 17, Tenn.

Precision finishing

another feature of Accurate service



. . . and it lowers

the ultimate cost of your springs

THE accuracy with which the ends of your springs are finished—whether they are looped, hooked, ground or what have you—can be of vital importance to the assembly and/or operation of your product. Carelessness, poor design or use of improper equipment in this vital part of spring manufacture can add many dollars to the ultimate cost of your springs.

Here at Accurate, skilled springmakers know the importance of accuracy in finishing ends . . . we have the most modern equipment to do the job right and economically . . . and our practical, experienced spring engineers can often recommend modifications in end design to speed assembly of your product or to make it perform better.

This is just one of many reasons why Accurate service saves you money in the long run. We'll be happy to discuss what we can do for you. Write or phone today.

ACCURATE SPRING MFG. CO.
3823 W. Lake Street
Chicago 24, Illinois

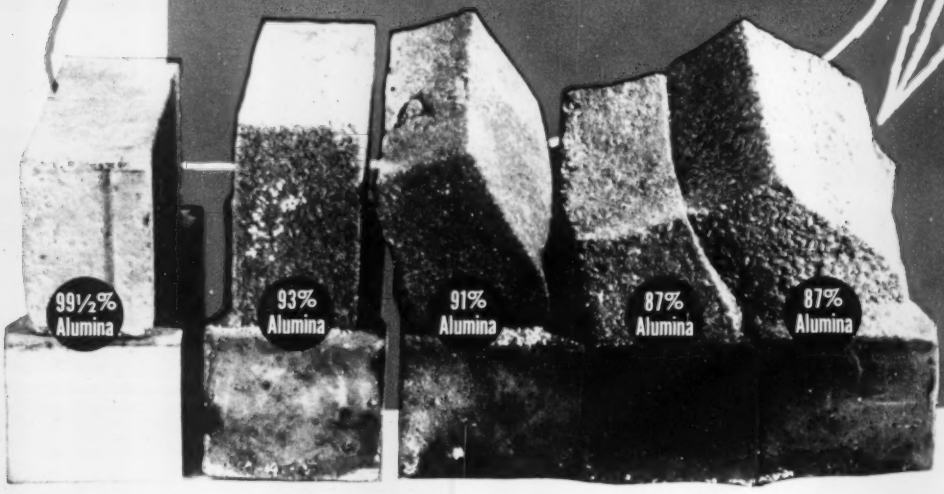
WRITE TODAY for your copy of the new revised Accurate Handbook of Technical Data on Springs. It's full of short cuts for making spring calculations.

Be sure the springs you buy are Accurate

Accurate Springs

Springs
Wire Forms
Stampings

Down time costs more than good refractories



Modern operators are using refractories fortified with ALCOA Alumina to increase the output of their metallurgical furnaces, chemical processing kilns, glass tanks and other high-temperature equipment. They know that down time costs more than good refractories, and refractories fortified with ALCOA Alumina *considerably reduce down time!*

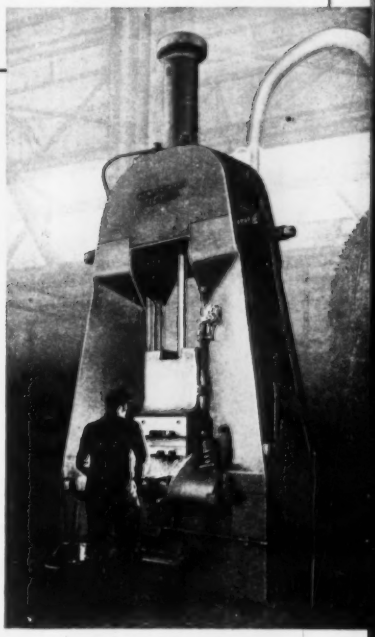
The increased stability and high-temperature resistance provided by ALCOA Alumina is clearly shown in the specimens illustrated above. All are alumina-content brick, and all were held at a temperature of 3400° F. (Cone 40, flat) for four hours. From left to right, the alumina content of each brick is: 99½%, 93%, 91%, 87% and 87%. You can see how important even a little extra ALCOA Alumina is to the life of a refractory.

(Photo and data: Richard C. Remmey Son Co.)

Whatever your operating temperatures, you'll have less costly down time as a result of too-frequent refractory replacement, when you use alumina refractories. They provide strength and stability under load at high temperatures . . . resistance to spalling, abrasion and fluxing . . . resistance to corrosive slags and gases . . . negligible porosity and shrinkage. We'll gladly refer you to reputable manufacturers of high-alumina refractories. Write to: ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 622G Gulf Building, Pittsburgh 19, Pennsylvania.

Alcoa Chemicals

ALCOA ALUMINAS and FLUORIDES



SAFETY IS DROP FORGED

Except for the nylon "umbrella", shrouds and harness, a parachute is all drop forgings. For there can be no compromise with safety when bailing out... no part of the life saving apparatus can develop a weakness. So, like the metal parts on the harness of the skyscraper window-washer, the parachute's metal fastenings are all drop forged.

Drop forging means stronger, tougher metal... hammering breaks up the larger grains into smaller ones, with greater adhesive properties, meaning greater strength. Hammering takes advantage of the grain flow to make the part tougher and less susceptible to fatigue. Hammering, therefore, means greater safety.

Specify Drop Forgings... made on Chambersburg Hammers.

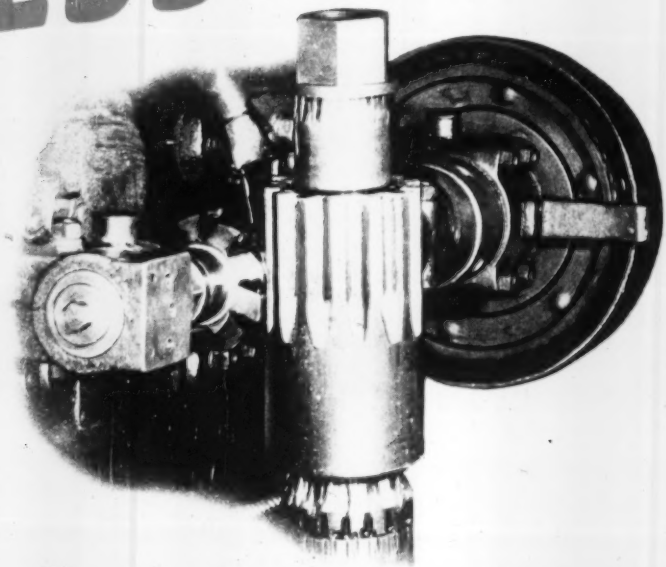
CHAMBERSBURG ENGINEERING CO. • CHAMBERSBURG, PENNA.

CHAMBERSBURG

THE HAMMER BUILDERS

MORE PIECES . . . LESS COST

. . . with Texaco Cutting Fluids and Lubrication Engineering Service



YOU GAIN important benefits when you use *Texaco Cutting, Grinding and Soluble Oils* and Texaco Lubrication Engineering Service. For example —

★★PRODUCTION GOES UP. Whether cutting or grinding, Texaco cutting fluids both lubricate and cool, eliminate chip welding or wheel loading. You can thus increase speed and feed for greater output, lower unit costs.

★★TOOLS LAST LONGER. Tools get full protection with Texaco cutting fluids. You get more cuts per tool grind or wheel dressing; there is less down time for tool changes, less replacement cost.

★★FINISH IS IMPROVED. Greater accuracy and better finish on the original cut mean fewer rejects and save additional operations.

Whatever the metal or your method of machining it, there is a *Texaco Cutting, Grinding or Soluble Oil* to help you do it better, faster, and at lower cost. A Texaco Lubrication Engineer will gladly help you. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO CUTTING, GRINDING AND SOLUBLE OILS FOR FASTER MACHINING

The Metalworking Outlook

July 16, 1951

Between the Lines

National Production Authority officials claim that no final decision has been made as to if and when all steel, copper and aluminum production will be regulated in a closed-end Controlled Materials Plan. Here's a strong hint that the decision has been made, that CMP will become closed-end by about Oct. 1: NPA has just notified all manufacturers of mass-production items which contain steel, copper or aluminum and were not previously included under CMP that they must apply for allotments of those controlled materials for use during the fourth quarter of this year. No specific mention is made of a closed-end CMP in the NPA announcement, but between the lines can be read the signs of a closed program in the making.

Some Old MRO Orders Hold

CMP Regulation 5 on maintenance, repair and operating supplies is now on the books (p. 41). But if you have outstanding MRO orders bearing the old DO-97 rating authorized under the revoked NPA Regulation 4, placed before July 6 and calling for delivery in this quarter, those orders will have equal preferential status with authorized controlled materials orders or DO-rated orders identified by an allotment number or symbol.

A Matter of 12 Cents

Companies without cost-of-living or annual improvement clauses in their labor contracts are unhappy—not because they don't have them but because the Wage Stabilization Board has allowed the pay increases, totaling about 12 cents since Jan. 1, to the firms that do have that type of contract. In effect, a company with that kind of agreement can bid 12 cents an hour more for labor and thus can man its forces at the expense of those firms without living and improvement clauses. The have-nots are putting pressure on WSB for relief. They have fair prospects of getting it.

In the Minority

Companies having living and improvement clauses in their labor contracts are in the decided minority. A statistical study on labor-management practices available from Associated Industries of Cleveland shows that among 302 Cleveland area companies surveyed 227 don't have improvement clauses, 217 don't have escalator clauses.

Antitrust Battle Looms

Watch for a new Congressional battle on proposed legislation to amend antitrust laws. The House has a proposal that would amend both the Federal Trade Commission and Clayton acts to permit sellers more latitude to meet the low prices of competitors. A similar Senate bill would amend only the Clayton Act. Federal Trade Commissioners,

Production Engineering News—p. 69 The Market Outlook—p. 133

Noah E. Mason dissenting, strongly oppose the amendments. The Senate bill is slated for floor vote early in August.

Freight Rate Hearings End

The proposed 15 per cent increase in rail freight rates would add about $1 billion to the nation's transport bill, but the railroads will probably get some, yet not all, of the boost they ask for. Interstate Commerce Commission is winding up lengthy hearings on the matter and will come up with a decision soon. The roads have already been granted an interim rate increase while their case pends—4 per cent for Eastern roads, 2 per cent for others.

The Road Ahead

What route should you follow in the tortuous economic paths ahead? Henry H. Heimann, executive manager of the National Association of Credit Men, advises: "Money spent to modernize plant and machinery will pay rich dividends. It is better to make your present plant more efficient than to add to your capacity, assuming your present capacity represents an integrated unit."

Debate on Structural Steel

Defense Production Administration says we're headed for a bad shortage in structural steel. But a district sales manager for a top steel company, who has been calling the shots pretty accurately for years, says this: "By November we will be scratching hard for structural business, and I think we won't find many interested customers." DPA claims that the fourth-quarter demand for structurals will be 2.4 million tons, while output will be only 1.3 million.

Signs of the Times

Automakers want price regulators to issue a "tailored" price regulation to replace present ceilings . . . Freight car builders will get enough steel this quarter to build 9500 cars a month . . . The Maritime Administration seeks White House approval for a new $100 million tanker-construction program . . . Lone Star Steel Co. has ordered more than $4 million worth of General Electric Co. equipment for a new East Texas works . . . More business for small business will be the aim of the Armed Forces Procurement Clinic to be held July 24-27 in Cleveland Central Armory.

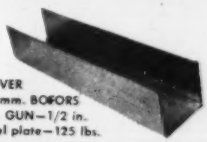
Here and There in Industry

The experience of one bellwether industry, tool and die making, indicates that the fast economic pace can hold, war or peace (p. 41) . . . Enforcement of NPA regulations will be tightened (p. 42) . . . A CMP hitch may snarl steel distribution (p. 43) . . . Demand for process control equipment has risen 300 per cent from the pre-Korean level (p. 44) . . . A record 52,273,000 tons of steel ingots were produced in the first half (p. 45) . . . Imported bicycles are coming into the U.S. loaded with materials no longer available to American producers (p. 52).

Creative METAL STAMPINGS

Save METAL - TIME - COST
for Prime Contractors of products for the Armed Services

A few of the many military metal stampings produced by the LEAKE organization

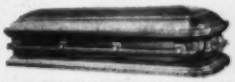


COVER
40 mm. BOFORS
AA GUN—1/2 in.
steel plate—125 lbs.

ELECTRICAL CONNECTOR LUG
Heavy Gauge
Copper
Tubing

COLD EXTRUDED CUPS
Steel Cartridge Cases

RADIO PROXIMITY
FUSE HOUSINGS
SIGNAL CORPS—
Silver Brazed
Assembly

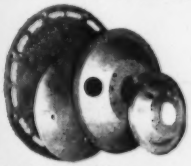


QMC REPATRIATION CASKET STAMPINGS:
Lid, Body, Base, Moldings, Rings, Plates, Clips

USAF NAPALM BOMB BAFFLES
.102" x 525-0 Aluminum

HALF TRACK GUIDE
& CROSS PLATES
SAE-4140 Steel

ORDNANCE
BOOSTER CASINGS



AIRCRAFT ALUMINUM
WHEEL FAIRINGS

ORDNANCE
CAPACITOR
CAN—Deep
Drawn Brass

NAVAL OIL FILTER SHELLS
Deep Drawn Brass and Steel

HEAD & BASES
FRAGMENTATION BOMBS
21,000 each daily

MAIN BEARING
AIRCRAFT ENGINE

TIMER HOUSING—NAVAL
DEPTH CHARGE—Deep
Drawn Naval Brass and Steel

ORDNANCE BOMB FUSE
ADAPTER—5/16-in. Drawn
Steel Plate

40 mm. BOFORS AA GUN:
Stamped Brass Components

TANK SEAT BACK STAMPING

IDLER WHEELS FOR TANKS
1/4-in. steel—15-in. dia.

"WATER BUFFALO" STAMPINGS
Heavy Gauge SAE-4130 Steel

INCENDIARY BOMB STAMPINGS
CHEMICAL WARFARE BRANCH

AERIAL DEPTH
CHARGE STAMPINGS

BASE PLUG FOR 20 mm.
SHELL—.550" dia.
x .114" thick steel

SERUM BOTTLE HOLDER
ARMY MEDICAL DEPARTMENT

AIRCRAFT SUPERCHARGER
BEARING SAE-4145 Steel

HEAVY GAUGE TANK STAMPINGS

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COMPLETE PRESSROOM—MACHINE SHOP
HEAT TREAT—BRAZING—WELDING
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The metal coating that stretches like r-u-b-b-e-r

Keep this in mind about Armco ZINCGRIP Steel:

Its *special* hot-dip zinc coating works more like rubber than metal. It flows and s-t-r-e-t-c-h-e-s in brakes and dies. It takes as severe a draw as the base metal without flaking or peeling.

Compare this with conventional galvanized sheets. When these sheets are drawn or formed severely the coating invariably flakes or peels. This exposes the base metal to early rusting and failure.

Armco ZINCGRIP has another important advantage. Actual field tests show that its special zinc coating gives longer protection against rusting in atmospheric service than equal-weight coatings on regular galvanized sheets.

Even if you can't include this Armco Special-Purpose Steel in your present plans, it will pay you to have complete technical and merchandising information for the day when it is more plentiful.

More Scrap Means More Steel!

Without *more* steel scrap, maximum steel production is *impossible*. New furnaces built by the industry cannot be operated at capacity with the present scrap supply. Help us help you. Sell your scrap . . . *today*.

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Phonies

Of the 1,593,000 tons of steel allocated by National Production Authority to the oil and gas industry in the third quarter, 351,000 tons is earmarked for domestic oil and gas country use. This tonnage, coupled with secondhand, foreign and conversion pipe and a reasonable reduction in inventory will permit drilling in the third quarter at the annual rate of 44,300 wells, which is close to the 1950 total.

Seeking a basis for distributing the 351,000 tons fairly, Petroleum Administration for Defense requested oil and gas operators to file applications for tubular goods they would require in the third quarter. A. P. Frame, assistant deputy administrator for PAD, revealed some significant aspects of the response to these requests in a recent address before the Kentucky Oil and Gas Association.

According to Mr. Frame, about 4000 companies filed applications for 1,200,000 tons of tubular goods for third quarter. A single operator asked for 100,000 tons—almost a third of the 351,000 tons available. He said he couldn't explain where he would use the steel until he was sure he could get it. Of the 4000 applicants, 600 had no previous drilling history. When applicants were requested by PAD to furnish date and plat of the lease upon which they proposed to drill, nearly 500 failed to reply.

Mr. Frame explained that a high percentage of established operators cooperated with PAD wholeheartedly. The trouble came from a few chiselers within the industry and to a much greater extent from a few hundred "outsiders," most of whom undoubtedly were trying to get steel to sell in the black market. Probably every agency charged with distributing tight materials has had similar experiences.

Much effort has been expended in trying to track down gray and black market operations. Sen. Blair Moody's hearings, now in progress in Detroit, have this as their objective. It is quite probable that excellent leads are on file in Washington. For instance, what about the company, unheard of in the oil industry, which applies for 600 tons of casing for third quarter? A check-up on such phonies might be illuminating.

E. C. Shaner

EDITOR-IN-CHIEF

WORKERS' OBLIGATION: Some recent work stoppages have occurred because employees resented the efforts of employers to get the same production with a smaller labor force. This prompted Chrysler President L. L. Colbert to point out to his employees the obligations that go with pay raises.

Reminding them that their contract states that "to produce more with the same amount of human effort is a sound economic and social

objective," Mr. Colbert went on to say: "Your pay increase of 4 cents an hour—and subsequent increases as provided for in our agreement with UAW-CIO is based on the expectation that Chrysler can produce more with the same amount of human effort. Otherwise the improvement factor becomes an unreal theory. If increased production is not forthcoming, any improvement factor increases would contribute to inflation and make your dollar buy less. No one would benefit."

If they are smart, union members will heed this sound advice. —p. 55

U. S. AID BOOMERANGS: In our Nation's attempt to be a sort of Santa Claus to much of the world, situations arise which place some of our small metalworking industries definitely behind the eight ball. American bicycle manufacturers feel that they are in this predicament and they are appealing to the Tariff Commission for relief.

Their grievance is stated simply. The ten manufacturers who assemble the products and parts of about 250 companies are subject to restrictions caused by material shortages. They have to omit from their cycles some of the trim which has definite sales appeal. But British and German bicycles, undoubtedly produced with American aid, are coming in not only in increasing quantities at low prices, but with glittering trim and attractive accessories which are denied to domestic manufacturers by the same government which grants advantages to the foreign competitors. —p. 52

WE'RE FOR IT, BUT . . . : Last week witnessed an odd alignment of sponsors of more government controls on prices and wages. Charles E. Wilson spoke vigorously for such controls, presumably to retain such powers as he needs to keep defense production rolling according to schedule. Eric Johnston went all out on the same line. So did most of the leading labor union chieftains.

As to the latter, there is a discrepancy which should be explained. The high command of CIO and AFL is going to great lengths to stir up support for more drastic controls. At the same time that the higher-ups were engaged in this effort, numerous wild-cat strikes were called by their rank and file. How did the strikers explain their walkouts? They said: "We are not striking against our employers. We are striking against federal controls."

How do you figure this contradiction? The dues-paying unionists are striking against the controls their leaders are advocating. —p. 55

PACKAGING IMPORTANT: Global war has forced military men and manufacturers to revolutionize their ideas about the packaging of hundreds of items used in warfare. In 1942 only 45 per cent of materiel arriving overseas was in usable condition, by 1945 the percentage had climbed to 75 and the present objective of the Defense Department is to raise it to 95 as quickly as possible.

This is going to involve a lot of research by military and civilian experts and also a greater appreciation on the part of defense contractors of the importance of proper packaging. Particularly, it means that a contractor who glosses over the packing and packaging specifications in his contract as being a minor detail is in danger of losing his shirt.

Safest way is to be sure you understand the specifications and figure your costs accurately. Another way is to farm out the packing and packaging part of the contract to specialists. —p. 70

RESISTANCE STIFFENS: Vote in the House on the Wolcott amendment to the Defense Production Act shows that congressmen are beginning to understand the extent to which the administration's policies are inflationary. The amendment, which was defeated by a 169 to 149 vote, declared it was the intent of Congress that no direct controls over prices, wages and credit could be exercised until indirect controls were utilized to fight inflation.

The Wolcott argument is that the DiSalle and Johnston efforts are futile as long as the administration persists in following a fiscal policy that is inflationary. The close vote on the amendment, coupled with refusal to give Mr. Truman additional powers, indicates an increasing doubt in Congress as to the soundness of the present domestic policies of the Truman administration and gives promise of a further advance toward realism. —p. 48

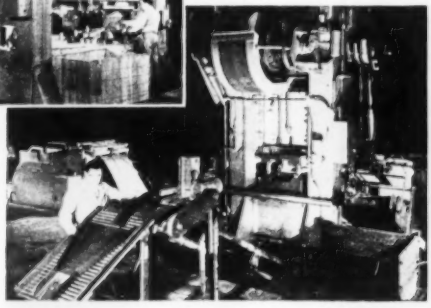
Firestone STEEL PRODUCTS SPEEDS DEFENSE SUB-CONTRACTS WITH NEW PRODUCTION LINES

Automatic Machines and Integrated Production Turn Out Large-Size Stampings in Record Time

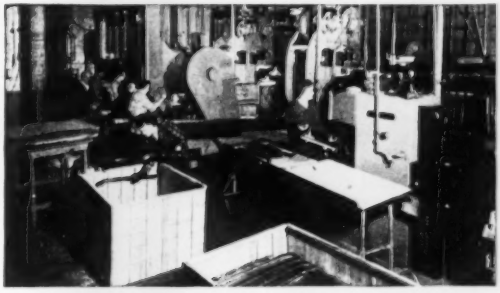
NEW automatic stamping machines are clicking out large-size stampings in record time at Firestone Steel Products, saving valuable time and money on defense sub-contracts. All production is integrated, from blanking through to painting or polishing.

Firestone's two modernized metal fabricating plants at Akron, Ohio and Wyandotte, Michigan have been completely retooled for fast, low-cost production of those heavy, large-size stampings and assemblies so vital to the speedy delivery of aircraft and ordnance equipment and accessories. If your problem is large size stampings in a hurry, wire or phone Firestone Steel Products Company, Stampings Division, Akron 1, Ohio.

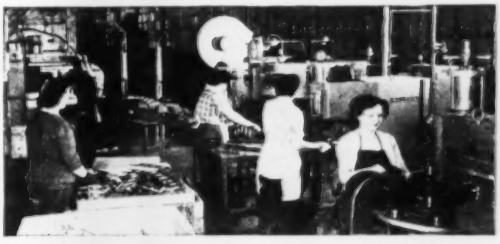
One of the huge multiple-die forming presses recently installed at Firestone for making jet engine components and parts for tanks.



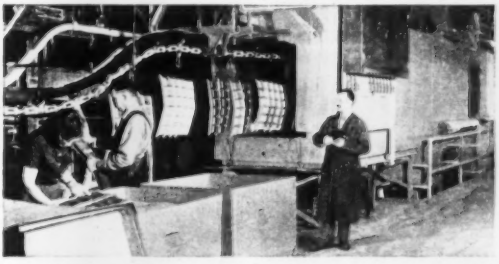
One of the new completely automatic synchronized presses producing 2600 large-size blanks per hour. Steel is fed from roll at extreme left.



Assembly operations are closely integrated with presses at Firestone, saving time and money. As many as four operations are handled at one time on new multiple-operating presses in left background.



Fast, efficient, straight-line methods save time and handling at Firestone. Parts move from presses on rollers or overhead conveyors to next operation.



Washing, bonderizing, painting, and baking are handled in a continuous automatic operation, moving entirely on conveyors from the stamping line.

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CMP
and Ryerson Steel Service

As you know, the Controlled Materials Plan went into effect July 1. The full extent to which CMP will affect our own operations and those of our customers is difficult to predict. But as of July 1, we are required by law to give the following precedence to orders for steel from stock:

1. Orders backed by CMP directives. These emergency CMP allocations of steel by the National Production Authority get the highest priority, as they did under CMP during World War II. Since directives are primarily placed with steel producers, the warehouse tonnage involved may not be large, but the kinds and sizes are likely to be those most in demand.

2. Authorized Controlled Materials orders. These orders, authorized by Government Agencies or Industry Divisions under CMP, received second highest priority, and they will probably account for a larger proportion of warehouse steel. A typical authorized Controlled Material order might bear the allotment No. K2-3Q51 in which K stands for the Agency or Division making the allocation; 2 represents the specific program involved, and 3Q51 stands for the calendar quarter in which the authorization is valid. It should be noted that the symbol DO-K2, used in conjunction with the K2-3Q51 authorization, is extended only for the purchase of finished products, such as chain, wire rope, fastenings, etc., or for non-controlled materials such as plastic or babbitt, and is not used when ordering controlled material such as steel. Another important note: The NPA has just set up a blanket authorization to be used by manufacturers of certain products who require only small amounts of carbon or alloy steel for production purposes. The symbol employed is SU. For details see Direction No. 1 to CMP Regulation No. 1.

3. Orders bearing the old NPA DO ratings and calling for delivery before October 1, 1951. These orders bearing the DO symbol plus two digits such as DO-97 for Maintenance & Repair or DO-21 for Miscellaneous Defense requirements will remain valid during this change-over quarter, which ends October 1. Until then they have third highest priority.

4. Non-rated orders. With our tonnage considerably under last year and demand higher than ever, we may not be able to fill many of these non-rated orders—much as we would like to. For, of course, shipment depends on our having the steel in stock, no matter what the priority. But you can be sure that we will always do everything possible to help you get the steel you need.

★ ★ ★

IT IS IMPORTANT, therefore, that you give us the highest rating to which each order is entitled. And, in the case of oral or phone orders, be sure to send a written confirmation, including the rating which applies, within 15 days. As we are required to report all cases in which confirmation is not received, your cooperation on this point is important.

We appreciate the fact that many questions are bound to arise under the changing regulations prevailing today. So please remember that we are always glad to work closely with you on your steel procurement problems. Just call our nearest plant.

REQUIRED FOR CMP STEEL ALLOTMENTS. One of the following CMP Forms must be used by manufacturers filing with NPA for authorization of schedules and allotment of steel.

Form CMP-4A. For prime and sub-contractors of Class A products.

Form CMP-4B. For manufacturers of Class B products.

Form CMP-4C. For prime and sub-contractors engaged in construction work and for manufacturers of Class A products used in such construction.

In addition, you may find helpful information in CMP Reg. No. 4 which concerns the controls governing the steel warehouse industry. For copies contact the National Production Authority's regional or field office near you.

RYERSON STEEL

STEEL-SERVICE PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI • CLEVELAND
PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

Good Business, Peace or War?

The experience of one bellwether industry, tool and die making, indicates that high volume can hold. Its 1951 sales will be up 25 per cent over 1950

AT LEAST one economic indicator shows high volume ahead, peace or war.

Based on first half signs, 1951 business for tool and die makers will run at least 25 per cent in advance of 1950 when estimated shipments hit $335 million.

In a STEEL-conducted survey of a cross-section of the 2500 contract shops in the industry, virtually no concellations of defense or civilian jobs are reported due to the possibility of peace in Korea.

Bellwether—The industry serves as a barometer of the economic weather because its services are needed by metalworking well ahead of actual production of automobiles, refrigerators, aircraft and many other products.

Often tool and die contracts are placed as much as eight months in advance for new auto models; in simpler jobs considerably less time is needed.

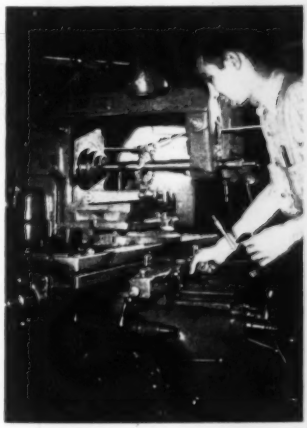
The important tool and die industry is composed of companies that make all kinds of dies (stampings, forging etc.), jigs, fixtures, molds for plastics, special gages, special cutting tools, special tooling and specially designed machines. Some companies also handle orders for short-run production jobs.

George S. Eaton, executive secretary of the National Tool & Die Manufacturers Association, points out that the industry has the order backlog to produce even more than it now is, but it hasn't the manpower to do the job. Its 35,000 to 40,000 employees (not counting those in tooling departments of companies primarily engaged in other work) are now laboring more than 50 hours a week because enough personnel can't be found and trained to man completely first shifts, let alone second, in most plants. Even in World War II, full second shifts were an unusual thing.

A few companies today have managed multiple-shift operations, but most shops have had to resort to expensive overtime to get out the work on schedule.

A Long Time—It takes 8000 hours to train a tool and die maker. Because that time isn't now available, because of the draft and because of the wage freeze, tool and die shops are having a tough time keeping their apprentice training programs moving along.

Training learners is especially difficult because present wage regulations don't permit pay to advance as fast as skills improve. Few tool and die shops have cost-of-living or annual improvement clauses in their labor contracts, so larger industries that do can in effect offer higher wages and thus hire skilled help away from the smaller jobbing facilities.



BAROMETER READING: HIGH
. . . order backlogs are triple 1950's

Right now the industry is campaigning for permission to meet the wage rates being offered by other companies.

Good Record—It has hopes of success. Although small—the average company employs only 15 or 20 workers—it has already done well in Washington. CMP allocations thus far to individual companies have been almost unanimously termed as "fair and reasonable."

So, the experience of a bellwether industry indicates there will be little or no letup in the economic pace, whether we have war or peace. About a month ago, 50 per cent of its volume was for defense. The proportion for rearmament business has jumped to an estimated 70 per cent today. Its order backlogs are now three times what they were in early 1950. New monthly orders are now coming in at approximately double the rate of early 1950.

CMP Regulations 5 and 7

They outline rules and procedure for getting supplies for repairs, additions, operations

NEED steel, copper, aluminum or other scarce materials for repairs, minor capital additions or as operating supplies? CMP Regulations 5 and 7 outline the rules and procedures under which you can obtain them.

CMP Regulation 5, which replaces NPA Regulation 4, provides for the acquisition of maintenance, repair and operating supplies under the Controlled Materials Plan.

CMP Regulation 7 does the same for parts and materials needed by repair shops. NPA Regulation 4 is superseded and revoked.

Self-Serve—Both the new regulations provide self-allotment procedures to obtain materials for MRO and repair shop needs. No application to NPA is required.

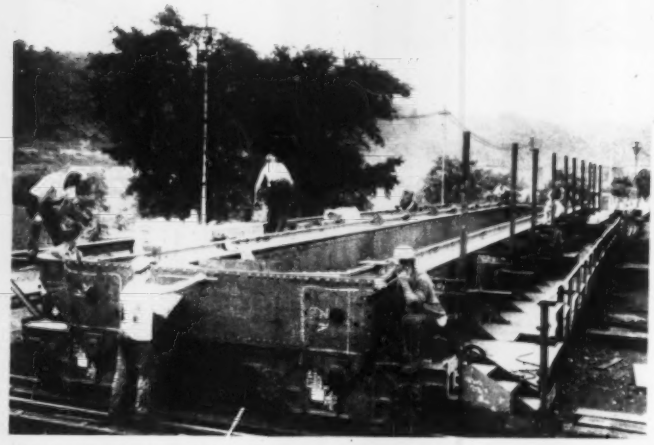
Under CMP Regulation 5, any business enterprise or institution may obtain normal amounts of steel, copper, aluminum and other materials to keep its plants and property in repair and operation and to make minor capital additions.

A major difference between this regulation and the old NPA Regulation 4 is that now manufacturers of A and B products to be used for maintenance, repair and operation will not extend the MRO symbols or the rating DO-MRO to obtain the desired materials, but will get them under procedures established in CMP Regulation 1.

Compute Own Quota—An organization planning to apply MRO symbols to orders for maintenance, repair and operating supplies must first compute its quarterly quota of such materials. The standard base period for this calculation is the calendar year 1950, the standard quarterly quota is 30 per cent of MRO materials purchased during 1950, figured in terms of expenditures.

If you operated on a fiscal year before Mar. 31, 1951, you may take as base period the last fiscal year.

If your business is seasonal, you may figure on a seasonal basis. The seasonal quota will be 120 per cent



DRY RUN: First crane for U. S. Steel's Fairless works takes shape—but not at Morrisville. This is the Ambridge, Pa., plant of American Bridge Co., and it's only a test assembly. After workmen fit together the heavy steel section, the crane will be dismantled for shipment to the mill site. American Bridge is fabricating 48 large cranes for the new plant. Wheels in foreground run on an overhead track extending the length of a mill building

of expenditures during the corresponding 1950 quarter.

If you were not in operation in 1950, get the text of the regulation. It has a formula by which you can figure your quota.

What's Minor?—A repair shop or organization specializing in maintenance and repair work may install minor capital additions for customers to the same extent that the customer would be permitted to make such additions. Cost of materials should be charged to the MRO quota of the customer.

A minor capital addition is defined as an improvement which costs, excluding labor, not more than $750.

CMP Regulation 7 defines the amount of controlled materials that can be obtained by a repairman. This may be either the amount the customer is entitled to under his MRO allotment or the amount the repairman actually needs in doing work for customers who are not entitled to establish MRO quotas under CMP Regulation 5. In the latter case, he uses the allotment symbol RE, assigned to repair shops by Regulation 7. He is limited in any calendar quarter to the following amounts of controlled materials: Steel, 20 tons, including not more than 3 tons of alloy steel and 1 ton of stainless; copper and copper-base alloy brass mill products, copper and copper-base alloy foundry products and powder, 500 pounds; aluminum, 500 pounds.

Actual Need Is Basis—A repairman who requires copper wire mill products for functional uses in his repair and maintenance work may use the allotment symbol RE on orders for these products to the extent of his actual need for the materials on jobs for customers not entitled to an MRO quota, but not in any one quarter for more than $150 worth or 20 per cent of what he used in his repair and maintenance work during 1950, whichever is greater.

To obtain materials other than steel, copper or aluminum, a repairman may use the rating DO-RE on orders for amounts he actually needs in his work for customers who have not the right to use the DO-MRO ratings.

To obtain other than controlled materials for jobs for customers who do have the right to the DO-MRO rating, the repairman must use that rating and not the DO-RE.

Small Users Get CMP Coverage

All small users of steel, copper and aluminum can obtain benefits of CMP allotments under a forthcoming amendment to Direction 1 of CMP Regulation 1. At present the direction applies only to those manufacturers of products not identified with an asterisk in the original Class B product list.

No application or report to NPA will be required by the small user. He can apply the DO-SU rating himself and send his order directly to the mill or warehouse supplier. The symbol can also be applied to orders for production materials other than controlled materials that are needed to complete schedules.

Warehouses and mills will accept orders from a small user only when they know that the quantity ordered is in line with his requirements. NPA won't concern itself with these orders unless suppliers report situations getting out of hand.

Producers affected are those whose quarterly requirements for manufacture of a Class B product, and of all other items in the same product class, do not exceed the following amounts of any of the controlled materials listed: Carbon steel (including wrought iron), 5 tons; alloy steel (except stainless), ½ ton; stainless steel, none; copper and copper-base alloy brass mill products, copper wire mill products, copper and copper-base alloy foundry products and powder, 500 pounds; aluminum, 500 pounds.

Regulation Enforcement

It's going to be vigorous—and stiff on violators of rules laid down by NPA

VIGOROUS ENFORCEMENT of compliances with NPA regulations covering control of critical materials (steel, copper and aluminum in particular) is in prospect. The word is that where there are wilful violations actions will be taken to impose fines as well as jail sentences. Such a policy was outlined in New York by Robert H. Winn, assistant general counsel of NPA, after he had completed a 13-state tour of Commerce Department regional and district offices.

Most violations reported to date concern excessive inventories and misuse of defense-rated orders. Mr. Winn says the agency's policy is primarily to assist and not to harass industry in complying with NPA regulations. Ten cases are far enough along for prosecution and others may be filed shortly.

Crack-Down—Actually, just about all businessmen are trying to conform with the sprit and intent of the regulations, says Mr. Winn, but there are those who don't and they will be prosecuted. Despite problems posed by extra stocks and their misuses in some cases, he thinks reports of excessive inventories in most instances are unfounded. More than 200 inventory checks, says he, reveal few cases of extra stocks. "The fact is," he points out, "there just isn't an important accumulation of stocks in the distribution field." And that is to say nothing of a tight situation generally at consuming plants.

Compliance with NPA regulations

will be handled through Commerce Department regional offices. NPA has some 300 investigators (some with accounting experience). Under CMP they will audit company books. Another 300 men (all experienced accountants) are lined up and will take over compliance duties when funds are available.

Pig in a Poke? Taking a crack at imported steel, Mr. Winn said: "The trouble with imported steel is that much of it doesn't come up to specification. Consumers are hesitating more and more before buying a 'pig in a poke'."

Mr. Winn, incidentally, anticipates a shortage of steel, aluminum and copper throughout the first half of 1952; he believes supplies will become a lot tighter yet before they improve. His opinion is not shared by some steel producers who look for a reasonable balance of supply and demand by yearend.

Tax Benefits Decline

The U. S. in the week ended July 6 was not as open handed as usual with tax benefits.

Defense Production Administration authorized only $125 million in new facilities as eligible for fast five-year writeoffs. That was less than half the $258 million in new facilities receiving such benefits in the previous week and was the second smallest amount since the government began making public its weekly tally of those benefits early last spring.

Only one company, Union Pacific Railroad, received permission to amortize a facility estimated to cost over $10 million. It was authorized to write off 80 per cent of the $17 million it expects to spend on railroad freight facilities. Twenty-five other firms received permission in the week to amortize new projects estimated to cost over $1 million but less than $10 million. The most common type of expansion included in that group was for the production of butane and gasoline.

The latest batch of certificates brought to nearly $7722 million the value of new facilities deemed vital enough to have received fast amortization privileges since the Defense Production Act went into effect last fall.

The number of projects involved with the July 6 week's 154 new facilities added brought to 2464 the number eligible for the fast writeofffs.

Life Still in New England Plan

There's still life—although a little faint—in the proposed New England steel mill project. Project sponsor, New England Steel Development Corp., has won its second four-month extension on the original certificate of necessity that would allow part of the facilities to be written off for tax purposes in five years.

Although fruition of the plans looks doubtful unless an existing steel company can be interested in the construction and operation of the plant, renewed interest has developed following the report by the President's Council of Economic Advisers indicating that a mill is needed in New England and that a market exists for its production.

Republic Buys Cleveland Site

Republic Steel Corp. paid $400,000 for a 28-acre tract owned by the state adjoining its Cleveland plant. The company will build a byproduct coke plant and a 1400-ton blast furnace on the property.

CMP Hitch May Snarl Steel Distribution

Some consumers, armed with CMP allotments, are booking orders with neighboring mills they don't normally do business with in a bid to save freight costs

FIRST major hitch in administration of CMP was unresolved last week.

The trouble is this: Steel mills are receiving orders backed by CMP allocations from firms with whom they have never or rarely dealt. There's no priority among CMP orders, so thus far the steel producers have had to take the CMP contracts on a first-come-first-serve basis. That means that some old customers with allocations may be out of luck in getting steel from regular suppliers, for beginning in September producers have been directed to sell to nonessential buyers only after preferred order bookings pass specified percentages.

The Reason Why The shakeup in normal steel supply channels threatens because of freight rates. Companies with CMP allotments are turning to steel mills closer to home to cut down on transport costs. When steel distribution was free or under the DO plan, many consumers had to go hundreds of miles to get what they wanted, and they had to pay the freight. Some companies see a chance to bypass that situation because of the way CMP is now constituted.

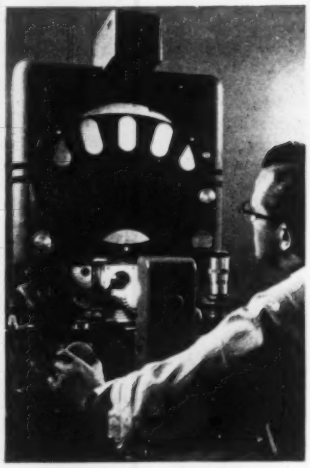
At least one major steel producer has pointed out the problem to National Production Authority in Washington, with a suggestion of how the status quo in steel distribution could be maintained. It was turned down.

Complication The situation is complicated by another NPA directive. Last week the agency told steel mills that starting in September when the producers are to begin giving the green light to holders of CMP allocations and priorities, they must red light those preferred orders if they exceed specified percentages of their output of those products. The rest of their production is to be reserved as free steel for makers of autos, refrigerators and other consumer durable goods at these quotas:

CALL OF THE WILD: Heavy construction equipment for the Labrador-Quebec mines of Iron Ore Co. of Canada is flown to the site over desolate bush country that would require weeks to travel on the ground. Here an International tractor eases aboard a C-119 Flying Boxcar on loan from the U. S. Air Force. Fifteen units have been flown to the Knob Lake, Labrador, camp so far

The table below gives the set-aside percentages of the output of each product for priority orders beginning in September. Thus, a maker of hot-rolled sheets must refuse preferred orders for more than 70 per cent of his monthly production.

	%
Ingots	95
Blooms, slabs, billets (including projectile and shell quality)	95
Sheet bars	95
Tube rounds	100
Skelp	95
Wire rods	95
Structural shapes	90
Piling	90
Plates	By directive
Rails, standard (over 60 pounds)	100
Rails, all other	90
Joint bars	100
Tie plates	100
Track spikes	100
Wheels and axles, railway and transit only	100
Bars, hot rolled, other (including projectile and shell quality)	78
Bars, reinforcing	70
Pipe	95
Oil country goods	100
Line pipe	100
Wire, low carbon	90
Wire, high carbon	85
Wire nails and staples	90
Barbed and twisted wire	90
Wire fence, woven and welded	90
Bale ties	95
Tin mill products, any combination	95
Sheets, hot rolled	70
Sheets, cold rolled	54
Sheets, galvanized	80
Sheets, all other coated	43
Sheets, enameling	10
Electrical sheets and strip, low and medium grade	95
Strip, hot rolled	70
Strip, cold rolled	60
Fence posts	90
Wire rope and strand	85
Welded wire mesh	75
Netting	95
Pig iron	20



SIGNIFICANT SHADOWS: At Ford Motor Co.'s Ypsilanti, Mich., quality control laboratory technicians can check dimensions of automobile parts to less than a hairbreadth—0.0001 inch to be exact. Here an operator checks a starting motor part by examining its greatly magnified shadow on a Kodak contour projector

WHERE ALLOCATED THIRD QUARTER MATERIALS WILL GO

Claimant Agencies and Miscellaneous	COPPER (pounds)	STEEL (tons)	ALUMINUM (pounds)
CAA & CAB (Airports)	271,000	2,782	23,000
DEPA (Construction)	77,000,000	300,000	38,000,000
DSFA (Coke Ovens)	624,000	22,635	——
FSA (Construction)	5,200,000	175,840	550,000
Maritime Administration	5,500,000	110,000	300,000
PAD	10,100,000	1,593,000	600,000
Federal Airways	200,000	285	13,000
Public Roads	750,000	300,000	——
Other Construction	31,000,000	1,271,641	8,000,000
NPA Industry Divisions			
Agricultural Machinery	8,619,000	673,723	6,774,000
Aircraft (Civilian)	500,000	13,000	4,228,000
Building Materials	69,156,000	1,374,416	79,993,000
Chemicals	172,000	——	3,322,000
Communications Equipment	53,670,000	67,700	2,618,000
Construction & Mining Machinery	7,721,000	763,500	2,375,000
Consumer Durables	17,270,000	337,851	8,059,000
Containers & Packaging	157,000	1,647,910	4,878,000
Electrical Equipment	131,497,000	566,410	26,488,000
Electronics	24,360,000	52,500	13,200,000
Engines & Turbines	12,720,000	621,350	3,271,000
General Components	169,679,000	1,147,750	13,940,000
General Industrial Equipment	111,131,000	1,715,500	37,455,000
Leather	248,000	5,689	653,000
Lumber	47,000	29,981	254,000
Motion Picture	1,862,000	8,909	2,810,000
Motor Vehicles	122,214,000	1,897,601	64,301,000
Ordnance & Shipbuilding	8,999,000	164,269	1,189,000
Railroad Equipment	37,385,000	882,417	6,300,000
Rubber	4,568,000	34,246	312,000
Scientific & Technical Equipment	50,445,000	94,500	14,700,000
Service Equipment	2,527,000	37,295	3,710,000
Mining	3,037,000	104,818	188,000
Total Allotments	968,629,000	16,017,518	348,500,000
Total Estimated Output	1,114,000,000	20,825,000	598,000,000
"Free" Material	145,371,000	4,807,482	249,500,000

Process Equipment Needs

Demand for control apparatus for defense rises 300 per cent and boosts subcontracting

A 300 PER CENT gain in demand for scientific apparatus and process instruments for basic defense industries is forcing the 15 or 20 companies that specialize in those devices to subcontract more of their work.

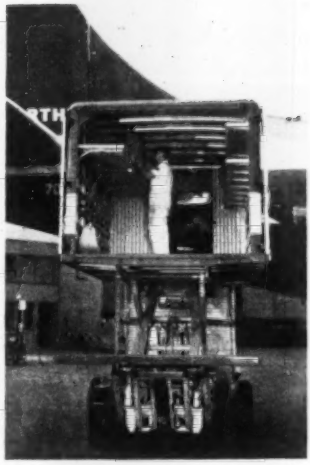
A major producer, Brown Instruments Division, Philadelphia, of Minneapolis-Honeywell Regulator Co., says it has subcontracted for about $100,000 in parts. An equal amount is being subcontracted for tooling at this time.

Yet To Come Henry F. Dever, president of Brown Instruments, says that subcontracts to supplement manufacturing will amount to 10,000 to 15,000 machine hours a month in production work and a total to the end of the year of 15,000 to 20,000 manhours for tooling work. Although substantial, that is only a small part of Brown's total production. More defense subcontracts will be coming. "We expect," says Mr. Dever, "that further awards will result from the co-operative action of the Chamber of Commerce of Philadelphia and Armed Forces Regional Council." The Business Development Center, sponsored by the Philadelphia chamber, is screening subcontracting bids it receives for work wanted by Brown.

Mr. Dever believes that the end of the greater demand is not in sight for scientific apparatus and process instruments for basic defense industries now running 250 to 300 per cent above pre-Korean levels. The increased need for such equipment arises partly because of the skilled manpower shortage. The apparatus, says the Brown Instruments president, "provides the catalyst that speeds output in heavy chemicals, metal producing and processing, petroleum, rubber, plastics, pipe lines, textiles and atomic energy."

Double Help Scientific apparatus and process instruments make it possible to break down complicated industrial process operations into simpler tasks where unskilled and semi-skilled can do the job. Mr. Dever also attributes some of the unusual increased demand for process instruments to recognition that those devices are one way to expand industrial production without necessarily adding to plant facilities.

Makers of control apparatus do a business that ranges from $60 million to $100 million annually, Mr. Dever says.



MODERN CHUCK WAGON: Northwest Airlines loads commissary supplies and cargo aboard Stratocruisers and DC-4s by this hydraulically operated check wagon. The unit rises to a height of 10 feet to reach the high galley doors on the four-engine planes

Relief for Tool Builders

More equitable pricing treatment comes to the industry that has been hard hit since 1945

TO BREAK the bottleneck in the machine tool industry, Mobilization Director Charles E. Wilson ordered the Office of Price Stabilization to modify price controls for the industry to the extent necessary for essential expansion.

OPS issued GOR (General Overriding Regulation) 15 permitting machine tool makers to make liberal individual adjustments in ceiling prices. GOR 15 goes into effect July 16 whether or not machine tool manufacturers are pricing under CPR 30. Otherwise the effective date of CPR 30, originally July 2, is postponed pending congressional action on price control legislation.

Cost Plus—GOR 15 goes beyond Supplementary Regulation 2 which was to give the industry price relief by allowing it to include increased costs for overtime and shift premium labor. Under GOR 15 a machine tool maker may get an overall adjustment enabling him to realize 80 per cent of his average rate of return from 1938 to 1948. For a particular machine tool or attachment, a manufacturer may get an adjustment giving him his total cost plus a profit of 5½ per cent.

Machine tool makers must file reports with OPS' Industrial Materials & Manufactured Goods Division before selling at increased prices permitted by the regulation. Within 60 days after a year has elapsed they must show actual rates of return compared with previous calculation or in the case of particular adjustments, actual average total unit costs.

A Higher Mark—The defense program is shooting for an annual machine tool production rate of $1 billion by yearend as compared with a rate of $432 million last March and of $675 million now.

Mr. Wilson's directive also called for assistance to the industry in procurement of adequate facilities, materials and components; easier financing, pooling of orders; the encouragement of subcontracting to assist a small manufacturer; and help in overcoming manpower problems.

The Labor Scene

The rate of voluntary quits—more than twice the layoff rate—shows labor riding high

THE LABOR PICTURE carries highlights, shadows and wavy lines.

The highlights are reflected from the iron and steel industry which met the highest monthly payroll in its history in May. It employed more persons than ever before—667,300—and paid out a whopper of a payroll—$249,007,000. That was an increase of more than $49 million from May of last year and more than double the average monthly payroll of ten years ago.

Slowdowns—Strikes and walkouts clutter up the labor scene: Chrysler and Hudson in Detroit last week were having their hands full with almost daily walkouts. At different times as many as 22,000 were idle at Chrysler Division plants, alone. In Cleveland 3000 employees of Addressograph-Multigraph Corp. struck.

A thousand employees at the Lorain, O., shipyard of American Ship Building Co. were idled. At last week's end meetings were going on between company and union officials at Ishpeming, Mich., seeking to end the strike of 300 Cleveland-Cliffs Iron Co. employees.

Pay Hike—Westinghouse agreed to grant unions representing a majority of its employees a 9-cent-an-hour pay hike, effective April 16.

The wavy lines sketched on the labor canvas were made by factory layoffs, hiring and the quit rate: Layoffs of workers in manufacturing industries rose in May for the second straight month largely because of cutbacks in auto output; the layoff rate per 1000 employees rose to 13 in May from 10 in April and 8 in March. Sharpest rise in layoffs was in the transportation equipment industry, including automobiles, where the rate went up from 19 per thousand in April to 36 in May. Despite the rise in layoffs, factory workers continued to be hired in May at about the same rate as in the three preceding months—45 per 1000 employees.

The relatively high rate of voluntary quits—more than twice the layoff rate—shows a well sustained demand for labor. Confirmation comes from the Census Bureau which says unemployment, showing the usual May-June rise, was at a postwar low for this time of year.

Steel Output Smashes June, Quarter, Half Records

STEELMAKING furnaces produced more steel in the second quarter and in the first half of 1951 than ever before in history, says American Iron & Steel Institute. June output was a record for that month: 8,658,000 net tons. Output in 1951's first half was 52,273,000 net tons as against 47.2 million tons in 1950's first half.

The record high output of the second quarter—26,593,000 tons—compares with 25.7 million tons in first quarter and 24.9 million tons in the second quarter of 1950.

In the first half of this year, for the first time in history, steelmaking furnaces were operated through six months at an average of 101.1 per cent of capacity compared with 98.0 per cent in the second half of 1950 and 95.7 per cent in the first half of 1950.

	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated	
1951	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	weekly production (Net tons)	Number of weeks in months
January	7,844,982	101.4	431,725	90.4	566,460	88.3	8,843,167	99.9	1,996,200	4.43
February	6,935,512	99.3	326,112	75.6	504,577	87.0	7,765,701	97.1	1,941,425	4.00
March	8,059,625	104.2	408,926	85.6	602,514	93.9	9,071,055	102.4	2,047,642	4.43
1st Quar.	22,840,119	101.7	1,166,763	84.2	1,673,041	89.8	25,679,923	99.9	1,996,884	12.86
April	7,857,161	104.9	392,472	84.9	590,888	95.1	8,840,521	103.1	2,060,728	4.29
*May	8,071,270	104.3	408,650	85.6	614,579	95.7	9,094,499	102.7	2,052,934	4.43
†June	7,669,000	102.4	403,000	87.1	586,000	94.3	8,658,000	101.0	2,018,000	4.29
†2nd Quar.	23,597,431	103.9	1,204,122	85.9	1,791,467	95.0	26,593,020	102.3	2,044,845	13.01
†1st 6 mo.	46,437,550	102.8	2,370,885	85.0	3,464,508	92.4	52,272,943	101.1	2,020,601	25.87

Note—The percentages of capacity operated are calculated weekly capacities of 1,746,337 net tons open hearth, 107,806 net tons Bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of January 1, 1951 as follows: Open hearth 91,054,020 net tons; Bessemer 5,621,000 net tons; Electric 7,554,630 net tons; total 104,229,650 net tons. * Revised. † Preliminary figures, subject to revision.

Hetz To Auction Smith Equipment

When Smith Contracting Corp. completed a 200-mile stretch of the 30-inch natural gas pipeline from Texas to New Jersey, it found it had a surplus of plate fabricating and earth moving machinery that it couldn't use for its normal requirements in the Texas field. Smith called in Hetz Auction Sales Inc., liquidator and auctioneer of Warren, O. So, on August 7, at Manassas, Va., 15 miles southwest of Washington, the reconditioned equipment will be auctioned off. Inspection can be made from July 16 to date of sale.

Westinghouse Wins Steel Order

Westinghouse Electric Corp. will supply about $350,000 worth of electrical equipment for an East Coast steel mill.

The plant will be used to convert iron-bearing materials from small particles, unsuitable for blast furnace reduction, to large porous lumps suited for charging blast furnaces.

Harvester Sublets 90 Per Cent

International Harvester Co. will subcontract between 80 and 90 per cent of the material it requires for present prime government contracts.

Harvester President John L. McCaffrey supports that statement with an analysis of three prime contracts, with a total dollar value of about $355 million, for an armored utility vehicle, an ordnance-designed motor truck and a military fuse. Harvester has already made arrangements with 327 subcontractors to participate in work on the armored utility vehicle. These 327 subcontractors have made arrangements with 1377 subcontractors of their own. Some 816 of the total 1704 subcontractors employ 500 or less. Harvester employs 219 subcontractors on the ordnance truck, and 90 per cent of the dollar value of the truck contract has been sublet. Only 20 per cent of the dollar volume of the fuse contract has been subcontracted. Of the 37 parts in the fuse, outside suppliers are making 30.

Normally, Harvester needs the daily help of more than 25,000 businesses to produce its civilian products.

Forms Small Business Liaison

Prime contractors whose agreements with the Air Force offer opportunities for subcontracting have been asked by the Air Force Office of Small Business to name a plant official to act as small business liaison agent with the Air Materiel Command. Procurement officials believe this policy will help to spread subcontracting dollars among as many small concerns as possible.

Has Steel Cartridge Case Award

Norris-Thermador Corp. will ready 435,000 square feet of its plant buildings at Riverbank, Calif., to make steel cartridge cases under contract with Army Ordnance. Engineering services and installation of special manufacturing facilities will cost an estimated $20 million, says K. T. Norris, president.

Rehabilitation work will begin within sixty days and Mr. Norris expects production to start early in 1952. Under three-shift operation, the plant would use almost 10,000 tons of steel a month. The company made steel cartridge cases in World War II and has continued in limited post-war production.

STEEL's Weekly Summary of Subcontract Opportunities

THE AIR FORCE production program for Pratt & Whitney's J-48 Turbo-Wasp adds subcontract possibilities for small businesses equipped to supply aircraft manufacturers. Two companies who will be major producers illustrate the opportunities that should result with reports on their projected operations.

Chrysler Corp., licensed in January by Pratt & Whitney to make the J-48, has a $91 million Navy contract to build a 1.6-million-square foot plant in Macomb county near Detroit for the job. Two new plants in Chicago, totaling 1 million square feet, are being completed by Hotpoint Inc. and will be used entirely for making the Turbo-Wasp engine. Production at Hotpoint will start in late fall, but no estimate is made by Chrysler for its Detroit operation.

Another jet engine program that should get increased attention as a subcontract possibility is that for the J-47-GE-23. General Electric Co. will build the engines at its Lynn, Mass., and Lockland, O., plants; Packard Motor Car Co. will turn them out at Detroit and Studebaker Corp. at South Bend, Ind.

In other awards reported, Missouri Valley Steel Co., Leavenworth, Kans., will construct 14 passenger cargo ships and 28 tugs, all diesel-powered, under a $7.5 million contract . . . National Steel & Shipbuilding Corp., San Diego, has a $5 million award from the Navy to build vessels of undisclosed type . . . Oliver Corp., Euclid, O., will turn out 2008 tank transmissions and final drive assemblies at a cost of $3.2 million.

More contracts awarded by the government follow in STEEL'S weekly summary:

PRODUCT	CONTRACTOR
Pumps, Fuel (motor driven)	Adel Div., General Metals Corp., Burbank, Calif.
Hydraulic Jacks	Auto Specialties Mfg. Co., St. Joseph, Mich.
	Dayton Aircraft Products Inc., Dayton, O.
Screw Jacks	Duff-Norton Mfg. Co., Pittsburgh
Primers	Western Cartridge Co., East Alton, Ill.
Tractors, Wheel Type	Buda Co., Harvey, Ill.
	Minneapolis Moline Power Implement Co., Minneapolis
	Wooldridge Mfg. Co., Sunnyvale, Calif.
	J. I. Case Co., Racine, Wis.
Tractors & Trailers	M-R-S Mfg. Co., Flora, Miss.
Tractors, Crawler Type	Caterpillar Tractor Co., Peoria, Ill.
	International Harvester Co., Melrose Park, Ill.
Tractors, With Sawpower Units	Little Giant Tree Feller Corp., Dallas
Trucks, Coal Delivery	Wall Mfg. Co., Winston Salem, N. C.
	Baughman Co., Jerseyville, Ill.
Fire Trucks	General Fire Truck Div., General Detroit Corp., Detroit
Scrapers	R. G. LeTourneau Inc., Peoria, Ill.
	Wooldridge Mfg. Co., Sunnyvale, Calif.
	American Tractor Equipment Co., Oakland, Calif.
Wagons, Crawler Mounted	Athey Products Corp., Chicago
Trailers	Electric Wheel Co., Quincy, Ill.
Snow Plows	Gledhill Rd. Machinery Co., Galion, O.
Compressors	Le Roi Co., Milwaukee
	Johnson Service Co., Milwaukee
Asphalt Plants	Barber Greene Co., Aurora, Ill.
	Cleaver Brooks Co., Milwaukee
Gradation Control Units	Barber Greene Co., Aurora, Ill.
Spreaders, Aggregate	W. E. Grance Mfg. Co., Dallas
Distributors	E. D. Tenyre & Co., Oregon, Ill.
Loaders, Excavators	Pettibone Mulliken Co., Chicago
Loaders	Ottawa Steel Products Co., Ottawa, Kans.
	Frank C. Hough Co., Libertyville, Ill.
	American Tractor Equipment Co., Oakland, Calif.
Winches	Jacques Power & Saw Co., Denison, Tex.
Cranes	Bay City Shovels Inc., Bay City, Mich.
	Link Belt Speeder Corp., Cedar Rapids, Iowa
Fork Trucks	Ross Carrier Co. Inc., Benton Harbor, Mich.
Conveyors	A. B. Farquhar Co., York, Pa.
Cannon Parts	Fallkill Machine Co. Inc., Poughkeepsie, N. Y.
	Machine Products Co., Houston
	Redco Tool Div., Red Lion Cabinet Co., Red Lion, Pa.
	Sandy Hill Iron & Brass Works, Hudson Falls, N. Y.
	Hexagon Tool & Engineering Corp., Dearborn, Mich.
	Premier Textile Machinery Co. Inc., Jersey City, N. J.
Suburban Carryalls	Chevrolet Motor Div., General Motors Corp., Detroit
Adaptors	Bastian-Morley Co., Inc., La Porte, Ind.
Indicators, Dial Type	Federal Products Corp., Providence, R. I.
Generator Sets	International Fermont Machinery Co. Inc., Ramapo, N. Y.
	Consolidated Diesel Electric Corp., Stamford, Conn.
Motor Generator Sets	John R. Hollingsworth, Clifton Heights, Pa.
	Electric Products Co., Clarkstone Rd., Cleveland

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to U. S. Commerce Department, Division of Printing Services, attention E. E. Vivian, Room 6225, Commerce Bldg., Washington 25. For ESA orders, write J. L. Miller, Economic Stabilization Agency, Room H367, Temporary E Bldg., Washington 25.

Materials Orders

COPPER—NPA Order M-74, effective July 1, 1951, prohibits use of copper and copper-base alloys in the manufacture of 30 items of building materials after July 1, 1951. In effect, this order takes over many of the restrictions on the use of copper and copper-base alloys in builders hardware items formerly included in NPA Order M-12. NPA Order M-4, NPA's basic construction order, now includes many of the restrictions on the use of copper and copper-base alloys in on-the-site use construction items formerly in NPA Order M-12.

CONSTRUCTION — Amendment of July 1, 1951, of NPA Order M-4 (construction) provides for several new provisions and adjustments, including limitations on the use of copper and aluminum for construction.

COPPER—Amendment of July 2, 1951, of NPA Order M-12 revises this order so it pertains principally to the production of brass and wire mills and foundries. The order also governs the use of copper and copper-base alloy products in chemicals, plating and other items not covered by other orders or programs authorized under the Controlled Materials Plan. The controls in M-12 will be effective only during July. This order will be superseded by revised M-16, which will control the distribution of copper raw materials.

BRISTLES — Amendment of July 3, 1951, of NPA Order M-18 is designed to relieve hardships of bristle importers and manufacturers of bristle brushes, and to tighten some provisions of the order.

ZINC—Amendment of July 5, 1951, of NPA Order M-9 places slab zinc under complete NPA allocation beginning Aug. 1, 1951.

STEEL SHIPPING DRUMS — NPA Order M-75 limits uses of new and used steel drums and limits inventories of new and used drums to a 45-day supply. Packing of 44 items, including some chemicals, food and miscellaneous products, is prohibited after Sept. 1. Packers are prohibited from using drums for products which they did not pack in drums during year ended July 1, 1951. Packers are permitted to use during any calendar quarter 22½ per cent of the new drums used in calendar year 1950.

MARINE MRO—Amendment to M-70, July 6, provides priority assistance for procuring marine maintenance, repair and operating supplies and minor capital additions. Marine firms which formerly applied DO-91P ratings to their orders may now apply for CMP allotment numbers to obtain controlled materials. DO-91P-rated orders for third quarter delivery automatically will be considered as authorized controlled materials orders.

ALLOY STEEL—Amendment of July 6 to M-1 provides set-asides for alloy steels will be computed on basis of planned monthly production rather than on shipments during previous base period. Action taken to make M-1 conform to CMP.

ALUMINUM—Amendment of July 6 to M-5 makes the order conform to CMP. It makes aluminum forms and shapes, listed in M-5, conform with Schedule 1 of CMP Regulation 1, brings authorized controlled materials orders within provisions of M-5, provides for continuance of provisions for equitable distribution of rated orders among suppliers, assures independent fabricators a supply of pig and ingot from primary producers and limits size of orders which distributors must accept.

NPA Delegation

CONSTRUCTION—Amendment of July 11 to NPA Delegation 14 authorizes eight government agencies to process applications to commence construction and operate under CMP. Affected agencies are: Federal Security Agency, Veterans Administration, Department of Agriculture, Housing & Home Finance Agency, Department of Interior, Petroleum Administration for Defense, Department of Commerce and Defense Transport Administration. FSA's authority is broadened to permit construction of school gymnasiums under certain conditions.

NPA Regulation

MRO—Regulation 4 is revoked July 6, being superseded by CMP Regulations 5 and 7.

CMP Regulations

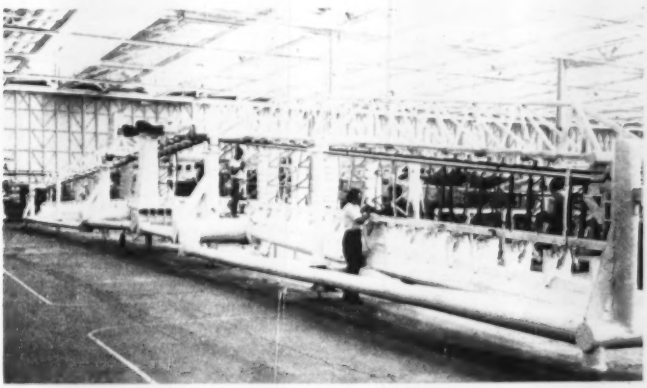
MRO—CMP Regulation 5, July 6, provides for acquisition of maintenance, repair and operating supplies under the Controlled Materials Plan. It replaces NPA Regulation 4, which is revoked (See page 41).

REPAIRMEN — CMP Regulation 7, July 6, provides for acquisition of supplies by repairmen under Controlled Materials Plan (See page 41).

DO RATINGS—Direction 2 to CMP Regulation 3, July 3, provides DO ratings previously assigned to be given equal status with authorized controlled materials orders during the third quarter.

Price Regulation

STOCKPILE MATERIALS — Amendment 1 of General Overriding Regulation 2 of the Office of Price Stabilization relaxes ceiling price restrictions on strategic and critical materials purchased by the General Services Administration for stockpiling. The amendment was effective July 3, 1951.



ONE-SECTION WING: A 115-foot steel fixture weighing 50,000 pounds is helping Consolidated Vultee Aircraft Corp., San Diego, Calif., save weight in its Convair-Liner 340. Wings will be assembled in one section instead of three used in the 240 wing. The fixture is the largest ever built by Convair for producing complete wings

Blaw-Knox Says Charge Unfair

Reaction of Blaw-Knox Co. to the government's civil anti-trust suit filed against it was that the government unfairly implies that the company is engaged in a conspiracy affecting national defense.

William P. Witherow, Blaw-Knox president pointed out that "the action deals with arrangements to export roll-making know-how to an allied country. In fact," he continued, "it is pretty much in keeping with the spirit of the government's own Point Four program." Mr. Witherow stressed that the matter in no way related to the national defense program.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

The close vote on the Wolcott amendment to the Defense Production Act proves that a growing number of congressmen are trying to stem the inflationary tide

REJECTION of the Wolcott amendment to the Defense Production Act intended to stop the inflationary policy of the Truman Administration was a defeat but not a rout of industry forces. The 149-pro and 169-con vote proves that a growing number of House members is aware of the inflationary course of the administration—and oppose it.

Design — The amendment would have declared it the intent of Congress that no direct controls over prices, wages and credit could be exercised unless and until indirect controls were utilized to fight inflation. Debate on the measure focused attention on the policy pattern by which value of currency is tied to the federal debt: The higher the debt, the cheaper the money and the higher the prices. The effect is a blush of prosperity and its continuance requires more inflationary shots every now and then.

Spelling — Rep. Jesse P. Wolcott (Rep., Mich.), who is father of the amendment, spelled out what the administration's fiscal policy means: 1. Reduction from 40 to 25 per cent in the gold reserves behind federal reserve bank notes. 2. Backing up of government notes with government bonds (debts) instead of with commercial paper. 3. Power of the administration to regulate inflation by the discount rate instead of using its power to fight and hold inflation in check.

Arithmetic—That all adds up to this: As long as the administration is free to follow such a pattern, the best efforts of an economic stabilizer amount to no more than a hill of beans as a bulwark against inflation.

Drama — Debate on the Wolcott amendment dramatized the impression one gets that the new powers requested by the administration (STEEL, May 14, p. 51) are intended not to fight inflation but to give the administration more control over the economy.

Latitude—Current indications are that Congress will refuse to give the President three powers that are particularly objectionable to industry. One would set up a federal licensing system for business concerns. Another would permit establishment of national production councils where labor and public representatives could overrule management representatives. The third would give the administration wide latitude in putting the government in industry in competition with private business.

Code for Inventors . . .

A good bet is that the National Inventors Council will win its fight for a code under which inventors contributing to the defense program will be assured of adequate compensation for their ideas. Here's why: (1) The President appointed an interdepartmental committee to study the matter; (2) Secretary Marshall created a top-ranking committee of the three services to see what can be done to remove inequities in dealing with inventors and inventions; (3) a bill to create an Inventors Award Board is being drafted by a leading senator. Any dissatisfied inventor—whether an individual, firm or corporation—could appeal his case to the board. No limit would be set on the size of the dollar award, and the board would act speedily, the award becoming effective 60 days after the decision.

Interested parties may get copies of the National Inventors Council's resolution and report by writing the council in care of the Commerce Department, Washington 25.

Supply and Demand for Steel . . .

Will the supply-demand balance in the various finished steel products ease up in September and the fourth quarter under CMP programming?

Opinions are mixed in the NPA (see p. 43 for one). Some informed officials say that because CMP allotments have been averaging considerably less than requests, the mills will have more tonnage for sale in the free market than previously. They predict that even the supply of plates and structural shapes will be easier. Others predict that the supply-demand situation will be even tighter. The definite picture will not be known until the NPA Iron & Steel Division's Production Directive Committee (J. S. Smith Jr., on leave from Inland Steel Co., is chairman) completes a series of conferences with the individual steel producers that won't end before late in July.

Each company's order books and rolling schedules are being studied—product by product—and tonnages are being switched from one producer to another when such action is needed to relieve congested schedules. Each company's picture is being studied under four categories—carbon steel, low-alloy high-strength steel, alloy steel and stainless steel.

In studying the order books and rolling schedules full provision is being made for the needs of converter customers.

Foundry Advisory Committee . . .

First foundry industry advisory committee to be called into an organizational meeting by the National Production Authority is the Malleable Iron Castings Industry Advisory Committee. It will meet in Washington July 19; the session will be presided over by A. J. McDonald, Chief, Castings Section, Iron & Steel Division. To be discussed are raw material supply problems, operations under the CMP and the prospects for intensified demands for defense and defense-support purposes.

Multistory Building Research . . .

First move in the new campaign to cut manpower and materials utilization in the building construction field was taken by the Housing & Home Finance Agency. It placed a contract with Illinois Institute of Technology for research on multistory apartment house construction. Findings are to be keyed at first to specific needs of the Chicago Housing Authority. Research work of the institute will be under direction of Elmer I. Fiesenheiser, associate professor of civil engineering.

Two AEC Research Contracts . . .

Among unclassified research contracts just placed by the Atomic Energy Commission are two in the field of metallurgy: At Columbia University, Dr. C. Bonilla is to investigate boiling and condensing of liquid metals; Dr. C. A. Crowley, of the firm of Graham, Crowley & Associates, will study electrotinning of zirconium.

Two expiring metallurgical research contracts were renewed: Dr. Lothar Meyer, University of Chicago, will pursue his study of the structure and properties of graphite; Dr. N. Baenziger, Iowa State University, will conduct further studies on the structure of intermetallic compounds.

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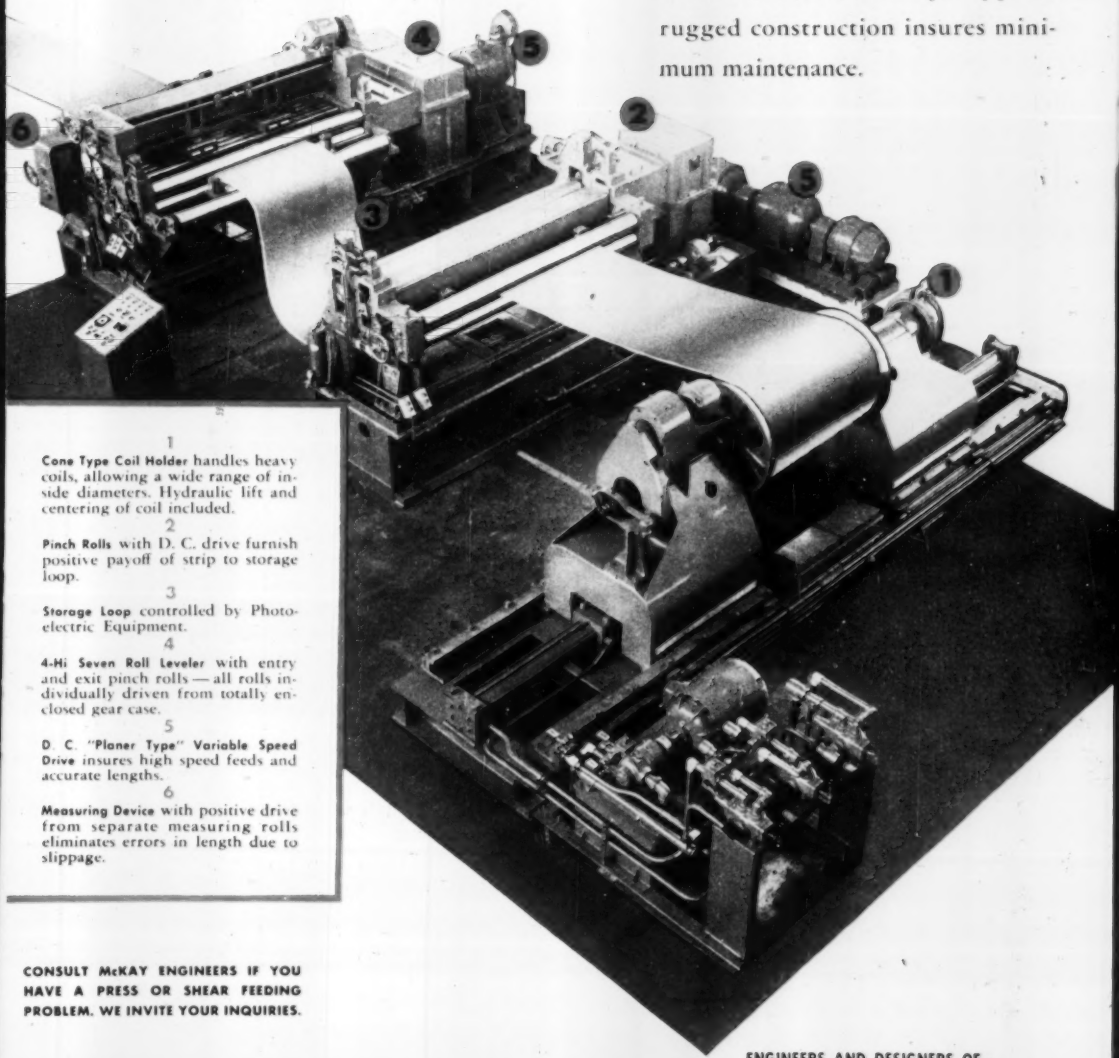

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Cone Type Coil Holder handles heavy coils, allowing a wide range of inside diameters. Hydraulic lift and centering of coil included.

2
Pinch Rolls with D. C. drive furnish positive payoff of strip to storage loop.

3
Storage Loop controlled by Photoelectric Equipment.

4
4-Hi Seven Roll Leveler with entry and exit pinch rolls — all rolls individually driven from totally enclosed gear case.

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D. C. "Planer Type" Variable Speed Drive insures high speed feeds and accurate lengths.

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Measuring Device with positive drive from separate measuring rolls eliminates errors in length due to slippage.

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ROTARY RETORT
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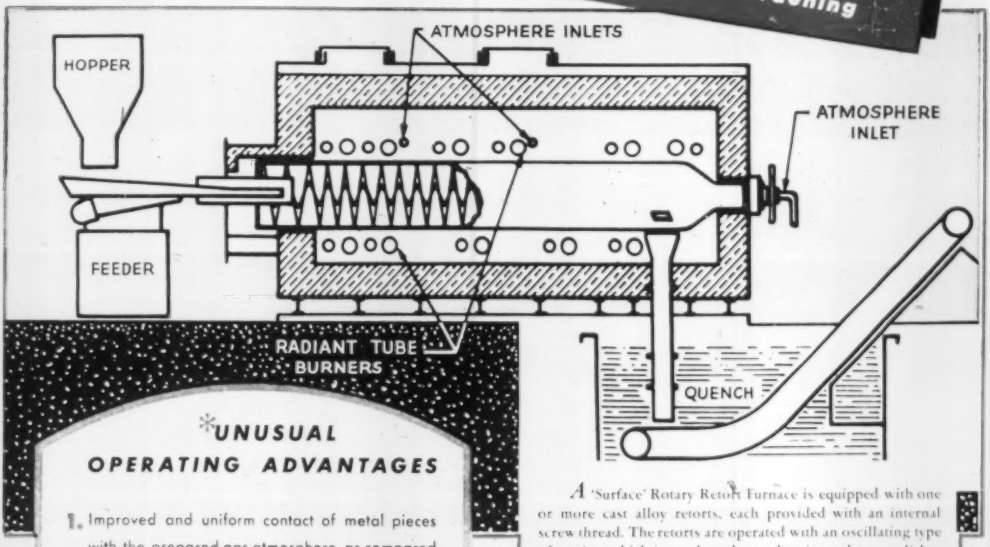

*A 'Surface' Rotary Retort Furnace is equipped with one or more cast alloy retorts, each provided with an internal screw thread. The retorts are operated with an oscillating type of motion which is gentle and non-abrasive and accomplishes a forward movement of the metal pieces through the retort.

*UNUSUAL OPERATING ADVANTAGES

1. Improved and uniform contact of metal pieces with the prepared gas atmosphere, as compared with other types of work handling.
2. High thermal efficiency. No trays or fixtures to heat or cool.
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5. 'Surface' RX Gas Atmosphere Generator supplies atmosphere gas for all modern heat treatments.

● 'Surface' Rotary Retort Furnaces are the first successful units of their kind because a protective atmosphere is utilized within the heating chamber as well as the rotary retort. A positive pressure is maintained within both areas, thereby protecting the metal from outside air contamination during heat treating and quenching.

These units provide unusually high quality heat treatment. Capital investment about 40% that of equivalent pusher-type furnace. Minimum space required for high production.

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Schuman Plan Approval Hits Snag

West Germans balk at the scheme that would pool steel and coal resources of West Europeans. Ruhr wants Allied controls lifted as a condition for its approval

WEST GERMANS are balking at the Schuman Plan that would put the steel and coal resources of West Germany, France, Belgium, Luxemburg and Italy under control of an international authority.

Details of the plan were drawn up in a lengthy Paris conference and now await approval by parliaments of the participating countries. The West German legislature may show a reluctance to ratify which, if continued to outright refusal, could scotch the whole scheme since the importance of the Ruhr's steel and coal resources makes its participation essential.

On Record—The reluctance comes despite the fact that West German Chancellor Konrad Adenauer has publicly stated he favors the plan. Parliament is dragging its feet because of a resolution by the German Economic Council calling upon the government to insist upon Schuman plan modifications before it O. K.'s the scheme.

The council wants ratification only if all interested powers agree that adoption of the Schuman Plan means removal of the Ruhr Authority, the Allied Steel Control Group, the Allied Security Board and cessation of all restrictions on Ruhr steel capacity and production. The council also thinks the Schuman plan should be adopted only if it permits more liberal capital investment in Germany since the Ruhr has not expanded and modernized as much as some of the other participants. The council insists further that the plan should assure Germany complete freedom in wages and provide that social reforms already won be safeguarded.

Powerful—The Economic Council, or Bundesrat, is an advisory group in which all 11 states of West Germany are represented. Its views will be noted by parliament, although not until after its summer recess.

Motives behind the council's resolutions are twofold: A natural desire to get rid of some of the occupation yoke and more than a little pique that it has not been more fully consulted during the course of Schuman plan negotiations.

German Steel Prices May Rise

A three-way wrangle on raising German steel prices is now going on among federal government, steel industry and Allied Authority representatives.

Steel men want increases ranging from $8 to $10 a ton. The Allied Authority thus far has declined to permit more than a $1-per-ton boost. Final decision won't come until new coal prices are figured.

The government will move gingerly on the steel price question because it just got its fingers burned on another pricing matter. It had decreed that manufacturers producing for export would have to pay more for their materials than those producing for the domestic market. That ruling aroused such a flare of protest that it was withdrawn.

The 1100 German foundries are hard pressed for scrap. They say they're getting 30 per cent less than they need. The scrap shortage generally is worsening in Germany even though exports have declined. Some 44,000 tons of scrap a month are now being shipped out of the country, in contrast to 110,000 tons a year ago.

Shortages Crimp U.K. Output

Raw material shortages, primarily in scrap, may hold British steel production to 17.9 million net tons, although it has capacity to turn out 18.8 million tons.

Behind that statement—from a government source, the British Treasury—can be seen the battle going on between the government and the British Iron & Steel Federation, a non-government organization that supplies the raw materials used by the U. K. industry. The government charges that the federation is trying to stymie nationalization by deliberately contributing to shortages.

The federation counters that the raw materials shortage is worldwide and that the government is simply looking for an excuse to move in on its activities. It points out that it is sponsoring a scrap drive that is raising an additional 12,000 tons a week. The federation says that the prime cause of the scrap shortage is that it can't import enough. Imports for the five months of this year ending in May amounted to only 310,000 tons, compared with about 1 million tons in the same period last year.

Steel Co. of Wales Ltd. has successfully completed trial runs on its new 80-inch continuous hot strip mill at the Abbey Works. One shift is now being worked; two will start soon.

Sollac Project Nears Completion

The $140 million Sollac project in Lorraine, France—the largest single program the Marshall Plan has aided—begins producing steel next year.

Sollac is short for Societe Lorraine de Laminage Continu (Lorraine Con-

REVERSAL: Dozens of British productivity teams have come to America to learn about U.S. methods, but now the procedure is reversed; representatives of the American pressed metal industry are in Britain to pick up tips. Here, F. C. Greenhill (left) president of Ackin Stamping Co., Toledo, and leader of the U.S. team, is greeted by W. S. Grainger, president of the British Sheet & Strip Metal Users' Technical Association

tinuous Strip Mill Co., will have headquarters at Hayange, Lorraine, and is a privately owned enterprise. Construction is being carried out in two stages to build a Little Ruhr in northern France. First phase will be the completion next year of a continuous hot strip mill at Seremange with an annual production of 785,000 tons of steel coil during the first year or two, to be increased by half later, and two continuous cold strip mills at Ebange with an annual production of 335,000 tons of light gage sheets and tin plate. Second phase will be completion by the end of 1952 of a coking plant of 84 ovens with a daily capacity of 1800 tons of coal, ingot facilities with a capacity to produce 560,000 tons a year and a blooming mill with an annual capacity of 1,120,000 tons.

Of the seven blast furnaces near Hayange, now producing 785,000 tons of pig iron annually, three will be rebuilt to increase production to an estimated 950,000 tons. Prewar Lorraine imported more than 65 per cent of its coke requirements. That will be reduced by using a new process converting Lorraine coal into a suitable coke.

Foreign Bikes Roll In

Imported units pour into the U.S. loaded with materials no longer available to American producers

AMERICAN bicycle manufacturers are concerned.

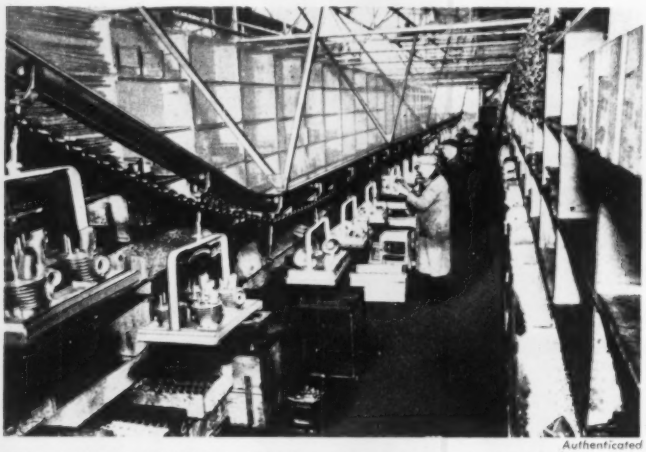
Foreign-built bikes—mostly from Britain and Germany—are pouring into the U. S. at a rate 40 or 50 per cent higher than last year, and they're glittering with trim and loaded with metals domestic makers can no longer put on their products. Some 3400 were imported in July, 1950; perhaps 5000 this July. Now being prepared is an appeal to the Tariff Commission for protection against increasing receipts of "extremely low priced merchandise."

Comprising—The bicycle industry consists of ten manufacturers who do the prime assembly work and about 250 others engaged in the manufacture of parts and various components, including tires. Because of materials shortages, its sales volume this year is expected to be 1.5 million to 1.7 million units, compared with 2 million in 1950. Sales in 1949 were nearly 2 million, although only 1.6 million were made. In 1948, the peak production of 2,750,000 could not all be sold and some were carried in inventory and sold in 1949.

If materials were available, the industry could sell 15 or 20 per cent more bikes this year than last. The Korean war affected bike sales just as it did everything else; 1,350,000 of the 2 million units sold last year were turned out in the last six months.

Into Defense—Bicycle manufacturers have thus far not entered defense work extensively, although they are pumping harder for government contracts. During World War II they made submachine gun parts, shell cases, tripods and related items. Because most makers concentrate largely on assembly work, they are best equipped in defense for punch press, light machining and assembly jobs.

Although a small industry—it rarely uses more than 100,000 tons of steel in a year—it is a productive one, and in World War II received more government awards to that effect than any other one of comparable size. It has turned out millions of bicycles over the years; 20 million of them are in America today, compared with 36 million passenger cars.



Authenticated

FRENCH BIKEMAKER BUSY: Motobecane, one of the largest producers of bicycles and motor bicycles in France, is working its assembly lines at full capacity. The bicycle, traditional means of transportation in France, is in constant demand, and export shipments are large. Pictured is Motobecane's motor assembly lines at Pantin

Austria To Produce More Ore

More iron ore is due from Austria. The famed Erzberg deposits will be developed so production can be raised to more than 8000 tons a day.

An earlier Marshall Plan project, in May, 1949, had been approved to boost the capacity to 6000 tons daily.

Dresser Reaffirms Plans

Dresser Industries Inc., Dallas, has reaffirmed its plant expansion plans of about $4 million and additional sums for product development after its executive committee reviewed current economic conditions and foreign developments. Dresser, a big supplier of equipment to the oil industry, had a backlog on June 30 of $60 million, $30 million up from last October, says H. N. Mallon, Dresser president.

The company was awarded several military projects and government assistance in the form of certificates of necessity for fast amortization of plant costs. One of those covers $1.5 million in new facilities for Roots-Connersville Blower Corp., Connersville, Ind., a Dresser subsidiary. Funds will be used for design and construction of large centrifugal blowers. Another certificate of necessity (for about $1 million) was issued to Dresser Mfg. Division, located in Bradford, Pa., for manufacture of high-alloy stainless steel rings for jet engines.

Another Dresser expansion project: Development and manufacture by Clark Bros. Co., Olean, N. Y., of a new gas turbine for long distance pipe lines.

Coleman Picks Up Slack

Coleman Co. Inc., Wichita, Kans., manufacturer of gasoline household appliances and home heating equipment, is picking up slack in civilian business by a $10 million backlog in defense orders. Defense work breaks down to 40 per cent quartermaster items like portable lanterns and cookstoves (essentially the same as Cole-

man's civilian line) and 60 per cent precision-built aircraft components. A substantial subcontract from Boeing Aircraft for landing gear doors won't get going until early 1952.

The civilian business silhouette shapes up like this: Sales are running ahead of last year; but earnings will probably take a downward thrust because of excess profits taxes, higher costs. From current indications sales should climb above 1950's $36,794,000 by almost $3 million. Purchases on dealer and consumer levels for heating equipment, particularly, ran ahead of last year for the first two quarters, but they may slacken off somewhat in the second half. Peak sales months lie ahead: Big sales to dealers usually occur in July and August.

Production of heating units is running at only 60 per cent of capacity—mainly because of materials shortages. Coleman will have to continue to scramble for steel until the fourth quarter when it becomes eligible for allocations under CMP. The company was declared an essential defense-supporting industry.

Coleman officials think they will make about 75 per cent of their standard line units compared to last year. Current inventories of finished products are down about 25 per cent from last year's levels.

Christil Tells About Itself

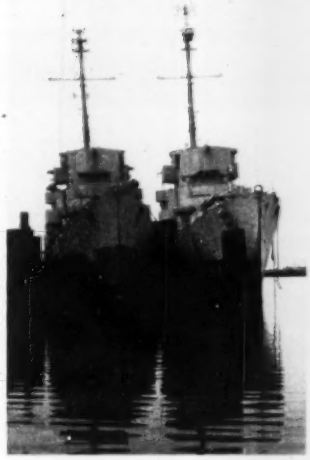
J. H. Christil Co., Edgerton, O., metal fabricator, produced a little brochure that it describes as a means by which it, a small manufacturer, stays in business. The 20-page publication describes and pictures Christil's tools and equipment and the way the company is run. Christil—famous for its colored (anodized) aluminum tumblers that started the company rolling—does subcontract work in the defense program. Says Roger Priest, general sales manager: "So far we are successful. We are doing work for four prime contractors."

Scrap Hearing Date Postponed

The hearing before the Interstate Commerce Commission on the petition of the Institute of Scrap Iron & Steel for a reduced freight rate on cars of scrap loaded to 80,000 pounds or heavier was postponed from July 24 for 60 days.

PEI Starts Scrap Drive

The Government Business Committee of the Porcelain Enamel Institute, Washington, started a three-pronged scrap drive among its members. The program: Searching out dormant scrap like obsolete machinery, tools, etc.; consideration of wrecking or dismantling projects that will produce scrap; and release of all production and dormant scrap into normal scrap channels.



FLOTSAM: Fontana-bound are these two destroyer escort vessels, the first of six that will be broken up for scrap by Kaiser Steel Corp. Weighing about 800 tons each, the obsolete vessels will provide nearly 5000 tons of scrap for Kaiser's hungry open hearths. Continued high rate of steel production in the West has made heavy inroads on scrap supplies

Armco Adds Annealing Furnaces

Heavy demands for the special grade of steel produced by electric furnaces made necessary the expansion of electric steel capacity at the Butler, Pa., division of Armco Steel Corp., Middletown, O. Construction began on a $2 million project, W. W. Sebald announces. A battery of new annealing furnaces is being built and equipment such as new shears is being added to process the steel. About 10 months' work should see the new project completed.

Good News for Coast Foundries

Approval by the National Production Authority of tax benefits of $54,939,000 to Kaiser Steel Corp. (STEEL, July 9, p. 43) comes as good news for West Coast foundries. Expansion of Kaiser's Fontana, Calif., plant will be largely in the pig iron making department; Pacific Coast foundries for months have been squeezed by tight iron supplies.

Installation of a third Kaiser blast furnace is expected to make some pig iron available for the general market—over and above Kaiser Steel's needs.

Estimates indicate the coast has a deficit of between 1000 and 2000 tons daily in pig iron.

But one question facing the long-term pig iron problem in the West is that of iron ore. Kaiser has proved and probable reserves at Eagle Mountain and Silver Lake sufficient for a minimum of 27 years at a consumption rate of 1.5 million tons per year—if only two blast furnaces are in operation. A third blast furnace would trim down the longevity. Next possible source for ore: Mexico.

Transfers in Navy BuShips

Capt. Richard H. Lambert, long time head, Welding, Casting & Forging Branch, Ship Technical Division, Navy Bureau of Ships, and assistant for metallurgy, Materials Development Division, Bureau of Ships, was transferred from Washington to become shop superintendent, Philadelphia Naval Ship Yard.

Lt. F. L. Doty temporarily is in charge of the Welding, Castings & Forging Branch, and will serve as assistant to Lt. Cdr. M. N. P. Hinkamp when the latter, sometime in July, takes over as head of the branch.

Capt. Lambert's duties as assistant for metallurgy, Materials Development Division, will be taken over sometime in August by Cdr. John B. Guerry.

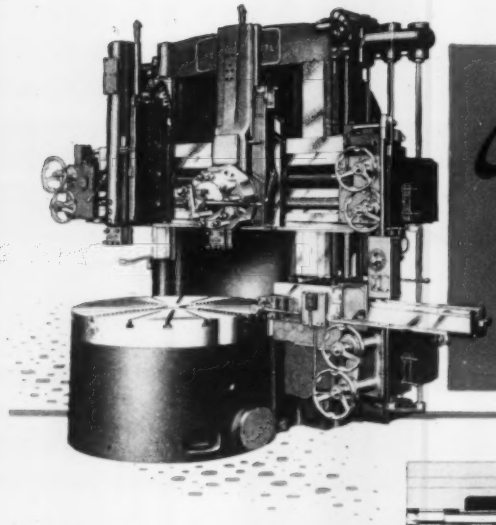
All those officers are full-fledged metallurgists, having taken post-graduate courses at Carnegie Institute of Technology, following graduation from Annapolis.

RFC Approves 23 Loans

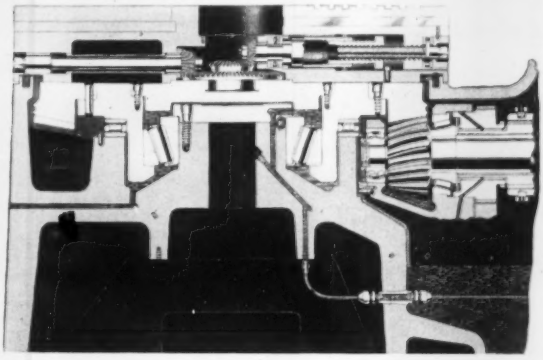
Last Reconstruction Finance Corp. loans to be approved through regional offices of the lending agency were recorded in the week ended June 27. After that date, new policy will have all loans cleared through Washington headquarters. Loans approved in this period numbered 23 and totaled $1,461,506.

In the same period, 40 other applications amounting to more than $15 million were turned down.

Of those approved, only five were for $100,000 or more. Largest amounts of $250,000 each went to Ekstrom Carlson & Co. of Rockford, Ill., wood and metalworking tool maker, for machinery and working capital and to S. J. Miller Packing Co. of Grand Junction, Colo., food packing company, for operating expenses.



Refinement in DESIGN



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By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Automakers are plagued by uncertainties—in materials, markets, new models, costs and defense orders. They're particularly uneasy about markets

DETROIT

AT NO time in the last six years has the automotive industry been so unsure of itself. It doesn't know: 1. Where its materials are coming from; 2. what its market is; 3. what it can do about new models; 4. how it can keep costs in line; 5. whether its defense orders will hold.

Disagreement—Despite the all-out campaign by mobilization officials to convince the country that the danger is still "clear and present," Detroit is of the opinion that a letdown in civilian buying and in the defense tempo will come in the wake of a Korean truce. Should this happen questions 1 and 3 will take care of themselves, and 2 and 5 become the overwhelming ones. If the administration is right and an uneasy peace does not materially lessen the danger of inflation or slow the urgency of rearmament, the points of worry for automakers are reversed.

As an indication of the uncertainty prevalent, one large auto producer last week was canvassing its suppliers to find out if they were adequately covered on steel for final quarter. Asked by one of these what the automaker's requirements will be, the auto producer's buyer was unable to give an answer. But officials of that same company, have indicated to STEEL that they are willing to bet scarce materials will come out of hiding immediately upon a Korean cease-fire. So, while purchasers are trying frantically to make sure their supplies are in sight, top management expects an easing in procurement problems. Neither knows even approximately how many units they can sell if they get their materials.

Cost Problem Remains — For all concerned the cost problem is ever-present. Although there was never any indication from management that it would like to welsh on the annual improvement factor (it, in fact, teamed up with labor to win WSB approval of the raise), happenings this year have been such that this contract provision would not come first in a popularity poll. Most of the labor disturbances among UAW-organized plants stem from complaints of speed-up and attempts to get the same production with a smaller labor force.

Auto, Truck Output

U. S. and Canada

	1951	1950
January	645,688	609,878
February	658,918	505,593
March	802,737	610,680
April	680,216	585,705
May	696,039	732,161
June	652,788*	897,853
July		746,801
August		842,335
September		760,847
October		796,010
November		633,874
December		671,622

Week Ended	1951	1950
June 23	158,909	205,334
June 30	156,105	197,767
July 7	102,127	137,731
July 14	143,000*	194,073

Sources: Automobile Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Chrysler President L. L. Colbert felt obliged to remind that company's employees, through their monthly magazine, just what obligations go with that pay raise. He wrote: "The theory behind the improvement factor is that by making our brains and machines take over more and more of the work that used to be done with our hands everybody will benefit—employees, owners and people who buy our products."

Quote — Quoting the contract's terms which state, "To produce more with the same amount of human effort is a sound economic and social objective," Tex Colbert went on to say "but we cannot—any of us—attain this objective of better living for all unless we take advantage of better tools, methods and equipment. Your pay increase of 4 cents an hour—and subsequent increases as provided for in our agreement with the UAW-CIO—is based on the expectation that Chrysler can produce more with the same amount of human effort.

"Otherwise the improvement factor becomes an unreal theory. If increased production is not forthcoming, any improvement-factor increases would contribute to inflation and make your dollar buy less—no one would benefit. The success of the improvement factor depends on how effectively we all make it work."

Employment the Problem — It doesn't take knowledge of differential calculus to figure that the government-directed reduction in automobile production is interfering at least temporarily with the ideal operation of the theory. Tex Colbert asserts that the theory "does not mean fewer jobs. It means more jobs." For the moment, however, because of materials limitations these jobs are not in civilian industry. That basically is the reason for the clamor which is resulting in Sen. Blair Moody's investigation into industry's problems. (STEEL, July 9, p. 57.)

The probe, which will locate around the steel shortage but will not be limited to that phase of the transitional turmoil in which industry now finds itself, began on Saturday with a group of small manufacturers testifying. Automakers, at this point, have few firm convictions about the effect of the investigation. Most view it with considerable skepticism but hope fervently that it will produce some vitally needed answers to their problem.

"Long overdue" seems to be the general feeling by manufacturers toward the hearings.

Union Officials Can't Wait

Unwilling to wait for these hearings before airing their complaints was a group of Chrysler union local presidents headed by Norman Matthews, director of the UAW-CIO's Chrysler department. They descended on Washington en masse Tuesday for meetings with Manly Fleischmann and Courtney Johnson of NPA, defense mobilizer C. E. Wilson, and congressmen from their respective areas to tell them what should be done to minimize drastic mass unemployment which they contend is now beginning.

The steel industry got their concerted fire, the unionists once again accusing it of planning insufficient expansion.

They carried the torch for quick adoption of Walter Reuther's proposal (STEEL, July 9, p. 57) for increased machine tool production, and reiterated the demand that Congress should enact a law supplementing state unemployment compensation with federal benefits to bring workers a full 40-hour-week's pay through-

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out any unemployed period resulting from transitional lay-offs.

Unemployment Worries Breech

Their contention that increasing unemployment is a serious problem has been bolstered by Ford's executive vice president, Ernest R. Breech, who last week stated, "There will be considerable unemployment in the period between the reduction of civilian production and full-fledged defense production." Mr. Breech is of the mind that sometime in the next 18 months the crest of the unemployment flood will pass.

This is the picture he sees: Automobile production for the rest of 1951 "settled pretty definitely" by NPA order M-68. Ford, Lincoln and Mercury production in third quarter approximately 256,000 units, 37 per cent under third quarter last year. Further reductions in 1952 probable. Then in 1953 "the major phase of Ford's defense program will reach its peak." He makes no prediction as to whether automobile production will then also turn upward, but suggests reduced output this year and next "creates the possibility that supply will not match the requirements of car-buying America." A pent-up demand, not unlike that which followed World War II, is again in store, he believes. It will be several years, he predicts, before this demand is met.

Trend Toward Lighter Cars?

Indication that NPA may be getting its wish that automakers concentrate more heavily on lighter cars is beginning to be seen faintly. Order M-68 provided flexibility in production for this purpose. Nash, for one, has increased its percentage of Ramblers to about 40 per cent of total production and step-up in the new Rambler hard-top convertible's production undoubtedly will be at the expense of the larger models. The time is getting ripe for Willys-Overland to come out with a small but conventional passenger car. A spokesman for the company admits that such a car is definitely in its forward thinking but also disclaims knowledge of when it will be introduced.

Suppliers who now have orders for components of this car, however, believe that early fall production of the new design is a certainty. It is assumed the first body style will be a two-door five-passenger sedan, and another model will follow.

Barney Roos, W-O first vice president, is a foremost exponent of the smaller car. Carefully engineered to provide equivalent transportation, safety and driving ease, such cars can make a good case for themselves in terms of materials-fuel savings.

Detractors from such cars in the 2500-lb class hold firm in the belief that "it costs just as much to hang a bumper on them as on the larger ones," meaning that the savings in materials costs are relatively small, and the labor expense is little different between the two sizes. The idea is firmly implanted, furthermore, in most automakers minds that any price reduction that might be possible with really large-scale production of such cars, would not approach that which is offered by the used-car market for standard size vehicles. This decision has been reached every time one of the large makers looks into the small-car possibility. Shelving and unshelving of new light car plans, however, continues to be a periodic experience for the market research and production analysts in several major companies.

Helping make the introduction date of the new Willys car uncertain is the strike at the company's transmission supplier, Spicer Mfg. Div., Dana Corp. Willys has had to stop production entirely, and last week recalled about 4000, less than half of its force, for the purpose of inventorying, a week-long job. Its parts inventory will be conducted the last week of August.

Dana isn't taking the strike sitting down. After the UAW brought suit against the company for $500,000, claimed as back pay and bonuses for the strikers, the company retaliated with a $1 million suit, with additional damages claimed of $100,000 for each day of the strike's duration. The company charges the UAW is unlawfully interfering with operation of other plants outside of Toledo.

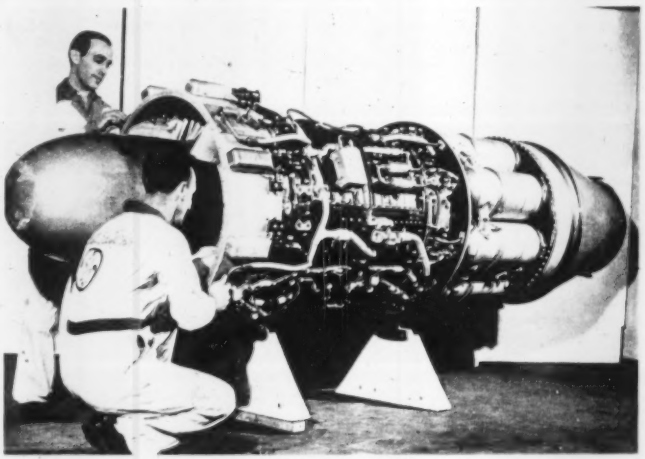
Other labor disputes, most of them in Chrysler Division plants in Detroit, idled an estimated 22,000 autoworkers at various times last week. Hudson continues to have its daily shutdown.

K-F Readies Dowagiac Plant

Kaiser-Frazer has announced its intentions concerning the former Round Oak Stove Co. foundry and machine shop at Dowagiac, Mich., purchased by K-F in 1947 but idle for a considerable time. The plant will be used by the company's engine division for production of components for Wright R-1300 aircraft engines, which are to be assembled in the Detroit facility of the division.

The Dowagiac facility will be equipped to perform about 47 percent of the machining operations on the 800-horsepower engine. Extensive rearrangement of the shop is necessary before production.

At Detroit, the engine facility which K-F bought from Continental Motors early this year is being tooled so that automobile and aircraft engines can both be produced. Tools from Air Force stocks are being brought in for the defense work, and present schedule calls for initial output of the training-plane engine in January.



ASK THE MAN WHO FLIES ONE: The Boeing B-47 Stratojet will take up Packard Motor Car Co.'s entire output of all-weather turbojet engines. The General Electric J-47-GE-23, which will be built on a new 700,000 square foot facility adjoining Packard Proving Grounds near Utica, Mich., is rated at more than 5800 pounds of thrust—over 600 pounds more than previously reported

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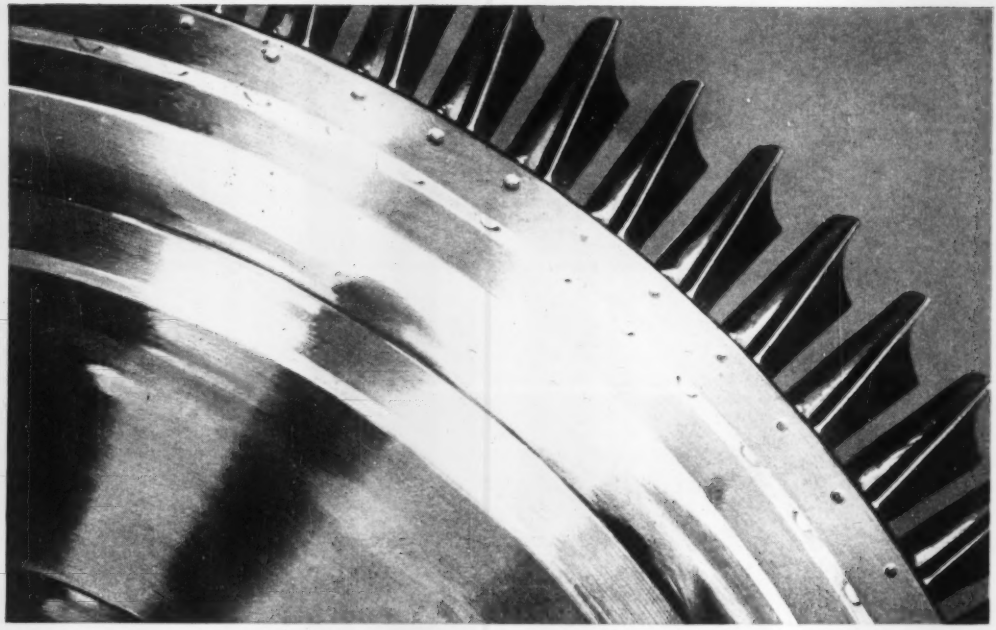
Houston 3, Texas

528 Fisher Building
Detroit, Michigan

3104 Smith Tower
Seattle, Washington

Monadnock Building
San Francisco 5, California



First gas-turbine locomotive in America has "16-25-6" in turbine wheel rim

THE steel that solved the problem of terrific stresses in aircraft turbo-supercharger rotors was "16-25-6"—a stainless alloy developed by the Timken Company. Commercial production of "16-25-6" for jet engine rotors helped make jet propulsion practical.

Now "16-25-6" pioneers again—in America's first gas-turbine electric locomotive, built by the General Electric Company!

Used for the high-speed rims of the turbine wheels, "16-25-6" does not distort under the 1300° F. gases and speeds of 6700 rpm. Besides high creep strength, it has high resistance to scale and corrosion, excellent weldability, good machinability and forgeability.

Since World War II, far more "16-25-6" has been produced than all other comparable alloys combined. This record—and the experience that goes with it—makes "16-25-6" the ideal material for today's high speed, high temperature applications. For further information about "16-25-6", write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

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Industry snaps back into stride after holiday layoff takes big bite out of production and drops activity index near year's low mark

BUSINESS as usual—if business in the past six months or so can be called usual—will be the watchword for industry during the coming "peace emergency." Even with the shooting stopped, the wheels of industry will be kept spinning fast on power from the military budget. Notwithstanding a probable readjustment of defense sights to cold war targets, the armament program is here to stay. It will prop up business activity for a long time to come.

Summer doldrums, once a common occurrence in industry, are becoming another relic of the past as artificial and natural booms force full year-round operations. The Federal Reserve Board's index of industrial production for the first three weeks of June matched the record peacetime mark of May at 223 per cent of the 1935-1939 average. Production in durable goods industries has remained unchanged since March. This pattern is likely to continue through the summer, with no significant rise in output till the vacation season ends. A gradual acceleration of output should start in September.

With most of industry taking a break on Independence Day, output totals for the week nose-dived. STEEL's industrial activity index for the week ended July 7 recorded the second-lowest mark of the year: 193 per cent of the 1936-1939 average. The week before the index was at 220. In the comparative week of 1950, the mark plummeted to 178 from 216.

Steel Pace Steady . . .

Tempering the sharp output drop because of the holiday was another week of above capacity operations in steel mills as most producers paid premium wages to maintain momentum. In the week ended July 14 steelmaking furnaces were scheduled to turn out about 2,029,000 tons of ingots and steel for castings, up 14,000 tons from the preceding week. More than 2 million tons of steel have been turned out for 19 consecutive weeks. A year ago 1,830,000 tons were poured.

Auto Assemblies Slump . . .

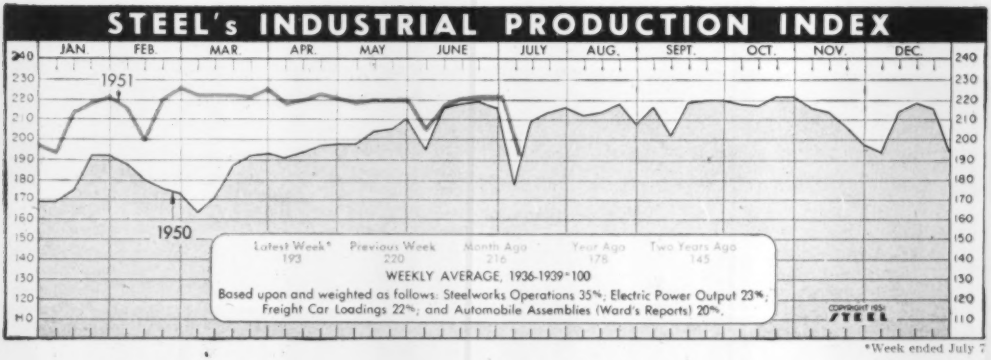
The shape of things to come was seen by automakers in the holiday week as they rang up their second-lowest assembly total since December of 1949. Only 102,127 autos and trucks were assembled by U. S. and Canadian producers in that week, ending July 7, as contrasted with 156,105 the week before. Daily assembly was ragged and four producers were almost out of production completely during the week. And the holiday was only a partial cause of the poor showing says *Ward's Automotive Reports*. Output and manpower adjustments made for unsettled operations generally as the industry began gearing its manufacturing to a July level about 14 per cent under June. Little stability in third-quarter assemblies is foreseen by *Ward's*.

June Construction High . . .

A whopping $2.7 billion was spent for new construction in June, according to estimates of the Departments of Labor and Commerce. The total was 6 per cent over May. All types

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.0	103.0	103.0	94.0
	Electric Power Distributed (million kilowatt hours)	6,077	6,898	6,734	5,380
	Bituminous Coal Production (daily av.—1000 tons)	1,760	1,839	1,437	1,697
	Petroleum Production (daily av.—1000 bbl)	6,169	6,181	4,168	5,475
	Construction Volume (ENR—Unit $1,000,000)	$404.7	$316.7	$296.0	$214.4
	Automobile and Truck Output (Ward's—number units)	102,127	156,105	152,656	137,731
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	740†	822	813	554
	Business Failures (Dun & Bradstreet, number)	129	188	172	138
	Currency in Circulation (in millions of dollars)‡	$27,948	$27,601	$27,520	$27,315
	Department Store Sales (changes from like wk. a yr. ago)‡	2%	+6%	+5%	+10%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$14,661	$16,610	$17,050	$13,031
	Federal Gross Debt (billions)	$254.7	$254.4	$254.6	$257.2
	Bond Volume, NYSE (millions)	$10.2	$14.4	$13.1	$16.0
	Stocks Sales, NYSE (thousands of shares)	5,183	8,724	5,829	6,374
	Loans and Investments (billions)†	$70.6	$70.4	$69.4	$68.0
	United States Gov't. Obligations Held (millions)†	$31,176	$31,186	$30,443	$36,638
	†Member banks, Federal Reserve System.				
PRICES	STEEL'S Weighted Finished Steel Price Index††	171.92	171.92	171.92	156.69
	STEEL'S Nonferrous Metal Price Index‡	226.0	226.0	239.1	184.0
	All Commodities†	180.5	180.8	181.9	159.6
	Metals and Metal Products†	188.2	188.2	189.3	172.0
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
Latest Week* 193
Previous Week 220
Month Ago 216
Year Ago 178
Two Years Ago 145
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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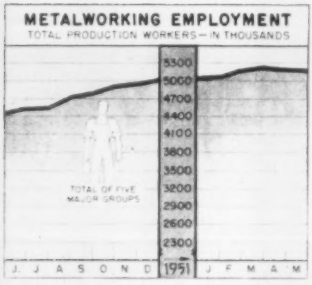
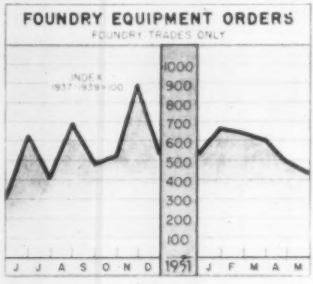
*Week ended July 7

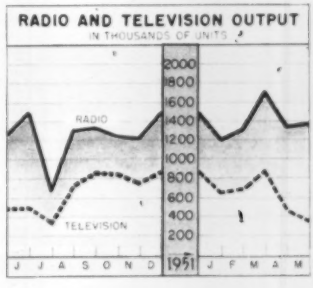
of construction expenditures recorded a gain with the exception of commercial building which was beginning to show the effects of tight controls. Private housing though at a high level was down 23 per cent from June of 1950, and is largely responsible for the 4 per cent decrease in the total for all private construction expenditures. For the first six months of 1951, nearly $14 billion has been spent, up 16 per cent from the same period last year and higher than any comparable period in history. Industrial construction, up $740 billion, accounts for much of the gain. On a weekly basis, heavy construction awards of $104,655,000 in the week ended July 5 make it the fifth highest total for the year. This is 89 per cent higher than the same week last year, says *Engineering News-Record*.

Coal Stocks Near Peak . . .

An eight-year peak in stocks of bituminous coal was reached on June 1 with a total of 74,807,000 net tons on hand, according to Bureau of Mines figures. The all-time high of more than 90 million tons was set in November, 1942. Industrial consumption and retail dealer deliveries are on the warm-weather downgrade as consumption in May dipped to 33,737,000 tons. This compares with 36,031,000 the previous month and 34,031,000 in May, 1950. On the first of June there was enough bituminous coal on hand to last 69 days at the current rate of consumption, with electric utilities topping the field with 121 days supply. But 1951 will see a rise of over 6 per cent in coal usage, says Appalachian Coals Inc., marketing agency. It estimates consumption this year at 481,331,000 tons compared to 453,113,000 tons used in 1950. It also estimates production will be up nearly 4 per cent to 531 million tons, as against last year's 512 million tons. Electric utilities will gobble up most of the increase. Bituminous Coal Institute says that







Metalworking Employment

Production Workers—Five Major Groups

	Prim. Mtls.	Fab. Prod.	Mach. inery	Elec. Mch.	Trans. Equip.
1950					
May	1,026	742	1,022	606	1,045
June	1,050	769	1,033	615	1,078
July	1,054	775	1,032	620	1,070
Aug.	1,086	814	1,060	655	1,118
Sept.	1,105	837	1,050	673	1,134
Oct.	1,117	850	1,104	710	1,157
Nov.	1,125	849	1,133	726	1,128
Dec.	1,142	852	1,163	724	1,160
1951					
Jan.	1,149	847	1,192	711	1,175
Feb.	1,153	853	1,219	716	1,228
Mar.	1,158	858	1,228	724	1,259
Apr.	1,159	858	1,234	717	1,244
May	1,161	848	1,245	706	1,221

U. S. Bureau of Labor Statistics

Foundry Equipment Orders

	Index		Value in Thousands	
	1951	1950	1951	1950
Jan.	668.0	159.3	$3,075	$731
Feb.	638.6	113.1	2,940	519
Mar.	599.9	225.2	2,758	1,034
Apr.	490.1	160.6	2,256	737
May	431.7	294.9	1,987	1,353
June		622.7		2,858
July		401.8		1,844
Aug.		693.6		3,183
Sept.		483.8		2,220
Oct.		516.8		2,417
Nov.		885.5		4,077
Dec.		526.2		2,412

Foundry Equipment Mfrs. Assoc.

Radio and Television Output

Thousands of Units

	Radio		Television	
	1951	1950	1951	1950
Jan.	1,203	935	646	439
Feb.	1,313	1,059	679	480
Mar.	1,720	1,349	875	687
Apr.	1,537	1,254	469	543
May	1,473	1,245	339	486
June	1,491		502	
July	666		327	
Aug.	1,304		721	
Sept.	1,335		844	
Oct.	1,230		838	
Nov.	1,216		739	
Dec.	1,566		858	
Total	14,590		7,464	

Radio-Television Mfrs. Assoc.

Charts—Copyright 1951, STEEL

electric utilities coal consumption for the year will pass the 100 million ton mark at present rates. Department of the Interior reports first half bituminous production totaled 266,232,000 tons, up 13 per cent from 1950. Anthracite production dropped to 19,781,000 tons from 22,224,000 tons the year before.

Wholesale Prices Ease . . .

Wholesale prices eased off for the fifth week in a row in the week ended July 3, says the Bureau of Labor Statistics. Its index of average primary market prices, at 180.5 per cent of the 1926 average, was 0.9 percentage points below the mark at the general price freeze in January. The index is still about 15 per cent above the pre-Korea average, and is expected to start edging upward again in the fall.

Work Stoppages Low . . .

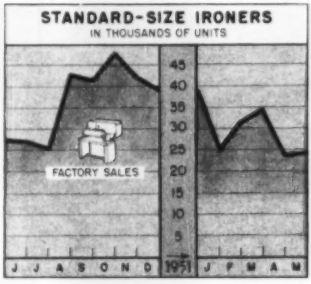
Labor unrest, often stirred up in times of economic transition, is remarkably low. Bureau of Labor Statistics figures show work stoppages in May totaled 400, which was an increase over each of the past three months. Considering the auto workers' and textile mill stoppages in that month, the figure points up the high degree of labor stability in the nation. Total number of workers engaged in the May stoppages decreased from 165,000 in April to 150,000.

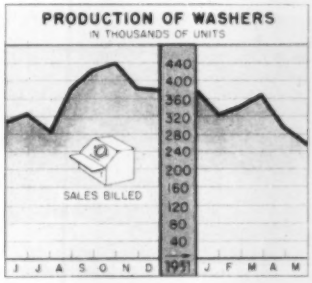
Trends Fore and Aft . . .

Overall business inventories on the first of June stood at $69.7 billion . . . Railroad freight car production in June remained at about the May level with 9644 cars delivered. Domestic freight car orders in June of 6793 brought total backlogs on July 1 to 147,725 . . . The American Appraisal Co.'s construction cost index rose 3 points in June to a high of 531 per cent of the 1913 average, an increase of 14 points this year . . . The oil industry will spend $4 billion this year for new construction and replacement of facilities. Year-end capacity should be nearly 7,062,000 barrels daily . . . Domestic airlines on June 30 wound up the best half-year earnings period in their history.

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Construction June25	Gray Iron Castings.. July9	Ranges, Gas June4
Durable Goods July2	Indus. Production .. June25	Refrigerators June18
Employ., Steel June25	Machine Tools July2	Steel Castings July9
Fab. Struc. Steel.... June4	Malleable Castings .. July9	Steel Forgings July2
Freight Cars June18	Prices June25	Steel Shipments July2
Furnaces, Indus. July2	Pumps, New Orders.. July9	Vacuum Cleaners ... June4
Furnaces, W. Air... May28	Purchasing Power ... June4	Wages, Metalwkg.. June18
Gear Sales July9	Ranges, Elec. June11	Water Heaters June25





Standard-Size Ironers
Factory Sales—Units

	1951	1950	1949
Jan.	24,600	20,300	28,300
Feb.	32,400	27,600	28,400
Mar.	34,700	37,800	23,800
Apr.	23,700	31,600	18,100
May	24,200	27,400	19,500
June		27,100	21,100
July		25,100	17,700
Aug.		42,700	32,300
Sept.		41,400	27,700
Oct.		47,500	36,045
Nov.		41,900	35,000
Dec.		38,800	19,400
Total		409,200	367,345

American Home Laundry Mfrs. Assoc.

Household Washers
Sales Billed—Units

	1951	1950	1949
Jan.	321,092	275,576	172,400
Feb.	341,328	342,967	201,300
Mar.	368,455	423,802	242,500
Apr.	292,193	333,072	192,500
May	253,942	304,640	211,700
June		325,217	260,700
July		282,261	200,900
Aug.		381,452	323,789
Sept.		424,043	357,281
Oct.		439,924	333,728
Nov.		379,964	298,717
Dec.		377,013	237,591
Totals		4,289,931	3,033,106

American Home Laundry Mfrs. Assoc.

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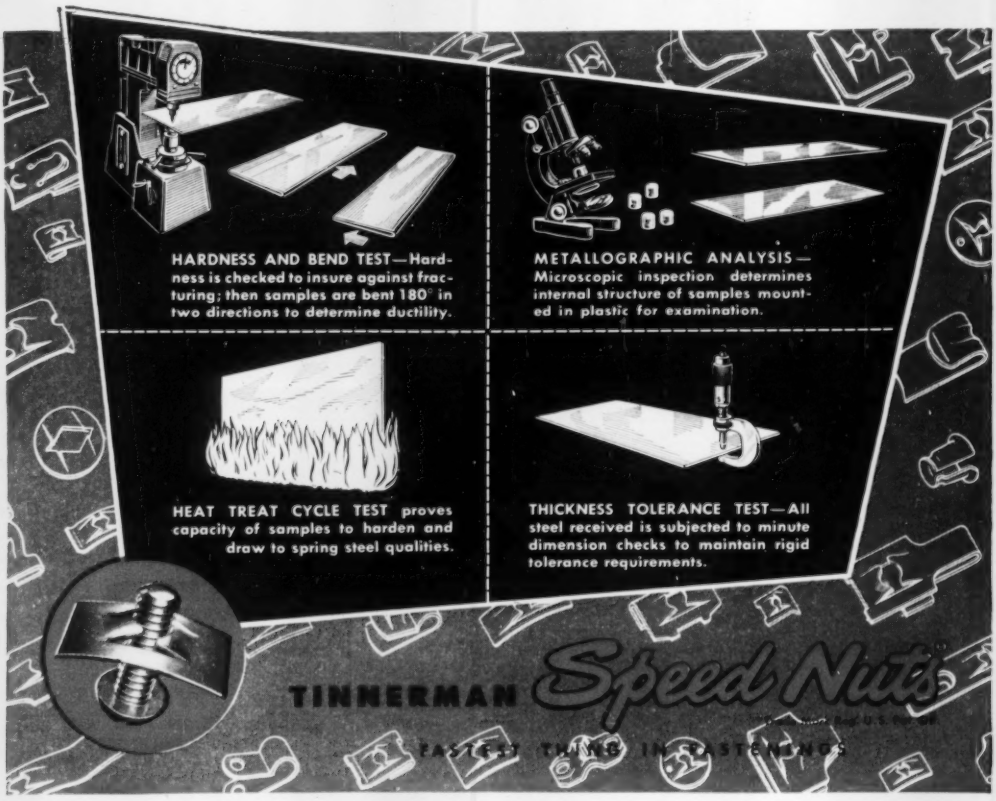

HARDNESS AND BEND TEST—Hardness is checked to insure against fracturing; then samples are bent 180° in two directions to determine ductility.
METALLOGRAPHIC ANALYSIS—Microscopic inspection determines internal structure of samples mounted in plastic for examination.
HEAT TREAT CYCLE TEST proves capacity of samples to harden and draw to spring steel qualities.
THICKNESS TOLERANCE TEST—All steel received is subjected to minute dimension checks to maintain rigid tolerance requirements.
TINNERMAN Speed Nuts

Men of Industry

ROY P. TOOKE
. . . Armco mgr., Butler Div.

E. F. ALLISON
. . . sales mgr., Deringer Metallurgical

J. P. HAIGHT
. . . Alcoa's fabricating gen. mgr.

Roy P. Tooke was appointed manager and **E. T. Mitchell,** general superintendent, Butler Division, Butler, Pa., **Armco Steel Corp.** Mr. Tooke succeeds the late **J. Gordon Gage.** He was previously general superintendent.

Frederic B. Stevens Inc., Detroit, has added **Thomas R. Williams** to its sales staff to represent the firm in eastern Ohio. As sales engineer in its plating and polishing department, he will have headquarters at Elyria, O. He formerly was a laboratory technician with Brown-Lipe-Chapin Division, General Motors Corp.

John P. Courtright was elected executive vice president of **Marion Power Shovel Co.,** Marion, O. He was made vice president in charge of sales in 1941, and continues in that position.

Lawrence E. Moore, controller of Vanadium-Alloys Steel Co., Latrobe, Pa., was elected a director of **Pittsburgh Control** of Controllers Institute of America.

Paul M. Nash was appointed chief engineer, Highland Park plant, Detroit, **Chrysler Corp.** He succeeds **Arthur H. Fries,** recently made works manager of that plant.

David J. Gemmell has resigned as executive vice president and director of sales of **Cleveland Chain & Mfg. Co.,** Cleveland. He joined the company in 1929, and previously was with United States Chain & Forging Co. for ten years.

R. W. Allen was named district manager, St. Louis branch, **Mack Motor Truck Corp.**

E. F. Allison joined **Deringer Metallurgical Corp.,** Schiller Park, Ill., as sales manager. He has been associated with metallurgical firms in the Midwest for the last 15 years.

James A. Mason, chief project engineer, Warner Electric Brake & Clutch Co., Beloit, Wis., has transferred to **Machinery Electrification Inc.,** Worcester, Mass., the New England outlet for the Warner line of industrial electric brakes and clutches.

Jordan D. Wood was appointed public relations manager, **Jones & Lamson Machine Co.,** Springfield, Vt.

John W. Gething was elected vice president, **Laclede Steel Co.,** with headquarters in the Arcade building, St. Louis. Associated with the company 35 years, he served as general superintendent for the last ten years.

Dean P. Hayes, formerly assistant sales manager, plastics division, **Modglin Co. Inc.,** Los Angeles, was named to the newly created post of staff assistant, metal products division. He will assist **M. G. Simpson,** manager of that division.

C. P. Harlow was appointed to succeed **Bill Sewert,** resigned, as hardware products sales manager, **Wickwire Spencer Steel Division,** Colorado Fuel & Iron Corp., New York. **William B. Kempton** continues as assistant hardware products sales manager. Mr. Harlow was assistant district sales manager, Boston office. Both he and Mr. Kempton continue to be located in the new sales office of the hardware products department at the corporation's subsidiary, American Wire Fabrics Corp., Mt. Wolf, Pa.

J. P. Haight was named general manager of **Aluminum Co. of America's** fabricating division, Pittsburgh, where, since 1947, he has been assistant general manager. In his new position he succeeds **R. R. Stevenson** who will retire in the near future, and whose services will be made available to the company for the next few months. Mr. Haight joined Alcoa in 1920.

G. E. Gunther was appointed assistant sales manager, **Thew Shovel Co.,** Lorain, O. He formerly was a district sales manager, central territory.

I. Melville Stein was elected to the newly created post of executive vice president, **Leeds & Northrup Co.,** Philadelphia. Mr. Stein has been a vice president, and is director of research.

Jones & Laughlin Steel Corp., Pittsburgh, announces retirement of **W. H. Dupka** as a vice president and director, and a member of the executive committee of the corporation. He has been associated with J&L since 1923.

Luther Harris was elected vice president-production, **Pacific Airmotive Corp.,** Burbank, Calif.

Three new vice presidents elected by **Double Seal Ring Co.,** Ft. Worth, Tex., are: **F. S. Goold,** who has been works manager, and is now vice president in charge of production; **R. W. Hoyt,** chief engineer, now vice president and chief engineer; and **Buyrl Wilson,** general sales manager, now vice president in charge of sales. Other promotions include: **D. L. Doherty,** chief accountant, appointed to a newly created position of special assistant to **A. R. Clark,** the firm's vice president

and secretary-treasurer; and **Fran Schmale,** industrial sales manager, made assistant to the newly elected vice president and chief engineer, Mr. Hoyt.

Sheldon R. Harper was placed in charge of sales promotion and advertising for the mechanical goods division of **Goodyear Tire & Rubber Co.,** Akron, to replace **R. W. Sabine,** promoted to manager of the division's distributors sales.

Lt. Gen. Albert C. Wedemeyer, who is retiring as commander of the Sixth Army, with headquarters in San Francisco, will become vice president and director of **Avco Mfg. Co.,** New York, Sept. 1.

Charles L. Campbell was appointed chief engineer, **Centrifix Corp.,** Cleveland. For the last seven years he has been with Diamond Alkali Co., Painesville, O.

Bob Wagner, who has been narrating and writing **Timken Roller Bearing Co.'s** "Message to Americans" radio program, has joined the advertising department at the Timken plant in Canton, O.

Leighton F. Korb and **J. Franklin Miller** have joined the **Freyn Engineering** Department of Koppers Co. Inc., Chicago, as contract engineers. Mr. Korb previously was general manager of National Steel Co. of Brazil at Volta Redonda, Brazil, from 1944 to 1951. Mr. Miller was with Tata Iron & Steel Corp., in India, as assistant chief engineer and development engineer.

Thomas C. Fogarty, executive vice president, metal division, **Continental Can Co. Inc.,** New York, was elected to the board of directors to fill the vacancy created by resignation of **Sidney J. Steele.**

Gilbert L. Hartmann, formerly vice president and general manager, **Milwaukee Flush Valve Co.,** Milwaukee, was elected president and treasurer to succeed the late **Julius S. Judell. Harry F. Leonard** was elected vice president in charge of sales. **Chester E. Rubringer** is secretary and assistant treasurer.

Plasteel Products Corp., Washington, Pa., named **R. J. Smith** as general sales manager. He previously served in a similar capacity handling steel building products.

ROBERT H. MADDAN JR.
. . . div. V. P., Columbia Steel

Robert H. Maddan Jr. was appointed division vice president, central sales division, **Columbia Steel Co.,** U. S. Steel Corp. subsidiary. He was formerly sales manager-manufacturing accounts, central sales division, and is succeeded by **Alex Walker,** formerly senior technical field representative, same division.

Kenneth S. Thomson was elected president of **Sterling Engine Co.,** Buffalo, succeeding **Frank G. Raichle,** who resigned both as an officer and director. **Leslie D. Calhoun** becomes vice president in charge of engineering.

Herbert B. Link, executive vice president since 1939 of **Bellows Co.,** Akron, was named president to succeed the late L. F. R. Bellows. **L. F. R. Bellows Jr.** was named vice president, and **Byron D. Kuth,** secretary-treasurer. The same officers were likewise named for Bellows Electric Sign Corp. and Bellows Products Inc., affiliated companies.

HERBERT B. LINK
. . . new president of Bellows

J. E. BOWEN
. . . a V. P. of Great Lakes Steel

J. E. Bowen was elected a vice president of **Great Lakes Steel Corp.,** Ecorse, Mich. He continues as general manager of the Stran-Steel Division with which he has been affiliated since 1937.

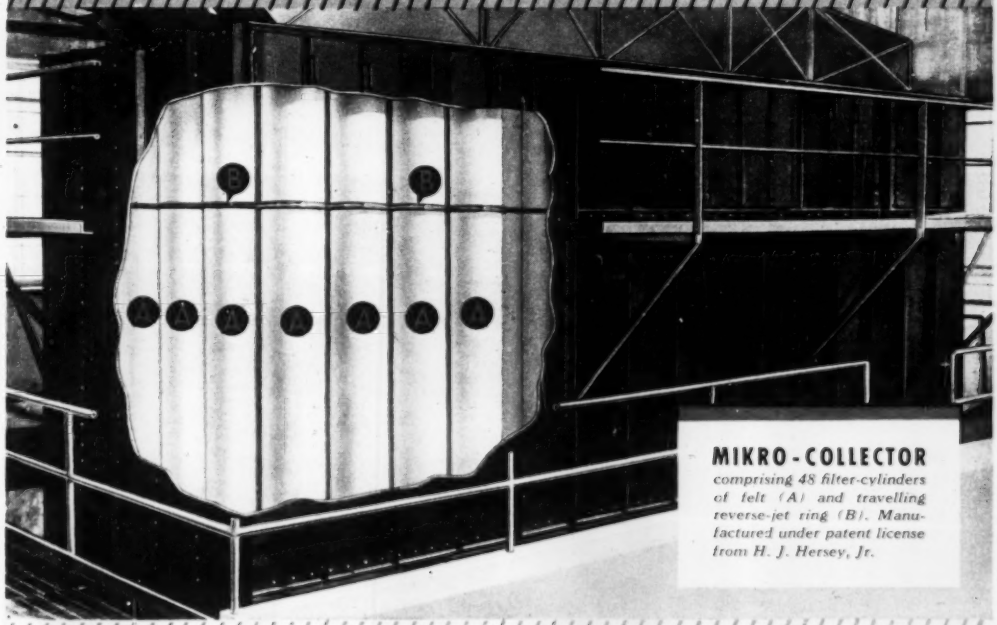
J. D. Brick was appointed district manager of the Pittsburgh office of **Electric Controller & Mfg. Co.**

Consolidated Vultee Aircraft Corp., San Diego, appointed **G. Irwing** manager of its guided missile plant to be built in Pomona, Calif.

Keystone Steel & Wire Co., Peoria, Ill., elected **Walton B. Sommer** vice president, and **Paul W. Sommer,** treasurer. As vice president Mr. Sommer will co-ordinate management problems between Keystone and its subsidiaries. He has been assistant to the president since March. **Paul Sommer,** who has been a vice president since October, 1950, succeeds **W. O. Fritze,** retired vice president and treasurer. Other appointments include **Frank A. Little** as director of purchases to succeed **W. C. Eckert,** re-

WALTON B. SOMMER
. . . Keystone vice president

Optimum dust collection...



MIKRO-COLLECTOR
comprising 48 filter-cylinders of felt (A) and travelling reverse-jet ring (B). Manufactured under patent license from H. J. Hersey, Jr.

with AMERICAN Felt

The unique principles employed in the MIKRO-COLLECTOR enable dust recovery (up to 99.999%) and phenomenal filter rates. Pulverizing Machinery Company, Summit, New Jersey, the manufacturer, states that American Felt's wool felt has been found to be a superior filter medium, permitting the easy handling of damp or dry, light or heavy dust-loaded air streams. With the Hersey travelling reverse-jet principle uniform filter resistance is maintained, thus assuring uniform air flow. Used in the handling and recovery of a wide range of dusts and powders, the MIKRO-COLLECTOR serves to eliminate atmospheric pollution, as well as providing full recovery of a valuable product. Dangerous or noxious dusts and minute size dust particles are easily handled. Installations for the handling of ultra-fine radioactive dusts during the past year have a combined capacity of more than 100,000 cfm. The MIKRO-COLLECTOR is manufactured with single and multiple filter cylinders of varying diameters and lengths to meet every requirement.

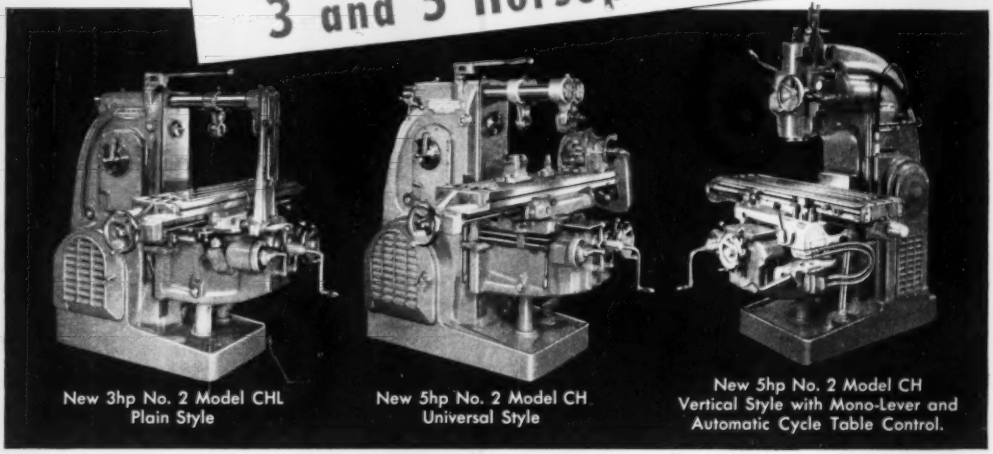
American Felt Company
TRADE MARK

GENERAL OFFICES 60 GLENVILLE ROAD, GLENVILLE, CONN. — ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn. — PLANTS: Glenville, Conn., Franklin, Mass., Newburgh, N. Y., Detroit, Mich.; Westerly, R. I. — SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Dallas, San Francisco, Los Angeles, Portland, Seattle, Montreal

Kearney & Trecker Announces . . .

THREE NEW KNEE-TYPE MACHINES

3 and 5 Horsepower



New 3hp No. 2 Model CHL Plain Style

New 5hp No. 2 Model CH Universal Style

New 5hp No. 2 Model CH Vertical Style with Mono-Lever and Automatic Cycle Table Control.

New Kearney & Trecker No. 1 CH, No. 2 CHL and No. 2 CH Milling Machines (Plain, Universal, and Vertical Styles) have every performance-proven operating and construction feature needed for modern short-run or production milling requirements

These specifications point up the new larger working ranges of these new machines. You'll find they provide you with new major cost-cutting possibilities for tool-room and production work. Feeds and speeds listed are standard ranges. Optional ranges available.

Machine	Working Surface	TABLE Power Feed Travel — Plain & Universal	TABLE Power Feed Travel — Vertical	Feeds Number & Range	Power Rapid Traverse — Per Min.	SPINDLE Nat'l Std. Taper	SPINDLE Speeds — Number and Range
No. 1 Model CH Plain, Universal and (swivel head) Vertical	40" x 10¼"	Long. 22" Cross 8" Vert. 17"	22" 10" 16"	16—1/2" to 32" 16—1/4" to 16"	150" 75"	40	16 — 25 to 1500 RPM
No. 2 Model CHL Plain, Universal and (swivel head) Vertical	45" x 10¼"	Long. 28" Cross 10" Vert. 17"	28" 10" 16"	16—1/2" to 32" 16—1/4" to 16"	150" 75"	40	16 — 25 to 1500 RPM
No. 2 Model CH Plain, Universal and (sliding head) Vertical	50" x 12"	Long. 28" Cross 10" Vert. 18"	28" 12" 15"*	16—1/4" to 32" 16—1/8" to 16"	150" — plain & vert. 100" — universal 75" — plain & vert. 50" — universal	50	16 — 25 to 1500 RPM

*Add 4" vertical travel for sliding head

If you're looking forward to modernizing your tool-room or milling machine line—you can't afford to overlook these new 3 and 5hp knee types. They offer you more practical operating features and heavier construction than any comparable equipment. They're designed to answer today's milling needs — and tomorrow's as well. For complete data on these machines, contact your nearest Kearney & Trecker representative or write direct. Kearney & Trecker Corp., 6784 West National Avenue, Milwaukee 14, Wisconsin.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

tired; **Ford P. Schusler,** sales manager of the industrial division; and **William H. Getz,** sales manager of the merchant trade division.

George V. Luerssen, chief metallurgist, was appointed vice president in charge of metallurgy by **Carpenter Steel Co.,** Reading, Pa. He succeeds **B. H. DeLong,** who retires as vice president and technical director after 41 years' service. **Carl B. Post** becomes chief metallurgist, and **George E. Brumbach** was promoted to metallurgist, succeeding Mr. Post.

Frank E. Watts Jr. was appointed assistant metallurgist for **Hunt-Spiller Mfg. Corp.,** Boston.

Carl A. Ten Hoopen Sr. was appointed assistant general sales manager, Cyclone Fence Division, **American Steel & Wire Co.,** subsidiary, U. S. Steel Corp. He will be located in general headquarters in N. Chicago. **Joseph F. Boyce** was appointed eastern district sales manager, Newark, N. J., for the division.

R. T. Eaton was appointed manager of sales, Pittsburgh district, **Bethlehem Steel Co.** He succeeds **C. H. Cecil,** resigned.

L. R. Gustin has been appointed superintendent of the bolt and nut plant of the **Bethlehem Pacific Coast Steel Corp.** in Los Angeles, succeeding **Robert Morgan** who has retired after 25 years with the firm.

John D. Gordon was appointed general sales manager of **Mechanical Handling Systems Inc.,** Detroit.

General manager of the **Ohlen-Bishop Manufacturing Co.** of Columbus, O., is now **E. W. Ristau.**

S. J. MORAN
. . . heads Blaw-Knox div.

P. M. FLEMING
. . . heads Blaw-Knox div.

Blaw-Knox Co., Pittsburgh, elected **P. M. Fleming** as president of Pittsburgh Rolls Division, and **S. J. Moran** as president of Union Steel Castings Division. During the past year Mr. Fleming has been manager of the division and now assumes the divisional presidency formerly held by **Q. S. Snyder,** retired. Mr. Moran during the past year served at Pittsburgh Rolls as general superintendent. As president of the division he succeeds **D. V. Sherlock,** retired.

John T. Edelen was appointed sales engineer in the Cincinnati office of the Machinery Div., **Dravo Corp.,** Neville Island, Pittsburgh. He is in charge of the Kentucky area.

P. E. Walters was appointed superintendent of production at **Westinghouse Electric Corp.'s** Motor Control Div. plant in Cheektowaga, N. Y.

L. Maynard Stauffer was appointed manager of General Electric Co.'s **Rocky Mountain Apparatus district.** Mr. Stauffer was formerly manager of the district's Salt Lake City office.

William V. O'Brien, a commercial vice president of **General Electric Co.,** Schenectady, N. Y., was appointed manager of the firm's Apparatus Marketing Div.

Robert Paxton was elected an executive vice president of **General Electric Co.,** succeeding **Hardage L. Andrews,** who retired.

William A. Sredenschek was appointed manager of materials and purchasing for **General Electric Co.** He will assume managerial duties formerly held by **Harry L. Erlicher,** who retired. **John A. Baldinger** was appointed General Manager of the **Automatic Transportation Co.,** Chicago division of Yale & Towne Mfg. Co.

Joseph W. Mueller was appointed assistant production manager for the **Kelvinator Div.,** Nash-Kelvinator Corp.

OBITUARIES...

Harold P. McCormick, Cleveland district manager, Reliance Division, **Eaton Mfg. Co.,** died June 19.

Charles F. Jenkins, 85, vice president, **Deemer Steel Casting Co.,** New Castle, Del., died July 2 in Philadelphia.

Webster C. Moore, 61, executive vice president, **Cordley & Hayes,** New York, died July 3.

Robert T. Brooks, retired executive vice president of **American Institute of Steel Construction,** New York, died July 2 in Minneapolis. Until retirement in 1946, Mr. Brooks had been connected with the steel fabricating and construction industry for more than 40 years.

Elmer R. Murphey, 72, founder and president of **James H. Rhodes & Co.,** Chicago, died July 4.

Leon A. Chaminade, 61, assistant chief engineer, **Chevrolet Motor Division,** General Motors Corp., Detroit, died June 27.

Alphonse F. Schulte, 51, superintendent at the **Production Steel Co.,** Detroit, before his retirement three years ago, died July 4.

Karl E. Lundquist, 65, founder and vice president of the **Lake City Foundry Co.,** Chicago, died July 3.

James G. Bryant Sr., 66, owner of the **Bryant Engineering Co.** of Port Huron, Mich., died July 5 at his summer home on Lake Huron.

Fred E. Holtz, 61, owner of **F. E. Holtz Inc.,** Milwaukee, died July 3.

James H. Harrison, 64, sales representative for **Ingersoll Products Co.,** Chicago, died July 2.

"Look What The Superintendent of a Leading Steel Company Says! We'll send you his name on request."

"The Trabon System on our old blooming mill gives us 50 more steel tons per week! We credit this increase and savings to the elimination of rejects."

Most of your machinery stoppages—due to bearing failures—could be avoided with Trabon. Shutdowns for lubrication are eliminated... Trabon lubricates as your machines produce!

Let us tell you about the features of Trabon oil and grease systems, and how they can save you thousands of dollars. Call or write today.

Trabon

OIL AND GREASE SYSTEMS

TRABON ENGINEERING CORPORATION
1814 East 40th Street • Cleveland 3, Ohio

PANEL-GLOW LIGHT—New light source, based on the principle of electroluminescence, employs thin flat sheets of conductive glass, coated with a phosphor dielectric plus a layer of vaporized aluminum, and connected at their edges to power wires, one to the glass and one to the metal backing. Brightness can be increased through use of a transformer, with a 4x6-foot panel on this basis consuming less energy than a 25-watt light bulb. Bright green is the only color now available; others including white are on the way.

HEAT LACQUER TO SAVE—Hot spraying of lacquer at Douglas Aircraft's El Segundo plant reportedly has cut 27½ hours from finishing time on AD-4 planes. One coat gives required film thickness, eliminating scuff sanding and the danger of exposing rivet heads and skin laps. Other favorable aspects of hot spraying (STEEL, March 12, p. 85) include reduced consumption of lacquer and thinner; better flow-out; reduced tendency to sag, blush or orange-peel, and a smoother, glossier appearance.

ALL-PURPOSE FLUID—Dilution of noncorrosive sulphurized cutting oils in automatic screw machines with oil from the machine lubricating or hydraulic systems may be overcome by the use of a single fluid for both cutting oil and machine oil. Dual or tripurpose active-type sulphurized oils have been developed specifically for such use in automatics where leakage is a problem. Precautions must be taken to add only new oil, not reclaimed, to the lubricant reservoir and hydraulic system.

SHAKE OUT SCRAP—Oscillating trough conveyors to handle loose bulk materials such as machine turnings, drillings, etc., are coming into wider use. A new automotive engine plant has installed them below floor level on all machines generating more than 40 pounds of chips in 8 hours. Essentially they are steel troughs of light-gage channel section supported by one-piece flexible members, with a small motor to provide the oscillating motion.

QUALITY CONTROL NO MYSTERY—Small plants fearing to dive into the intricacies of statistical quality control programs because of their presumed complexity and the lack of trained personnel to supervise the work may be impressed with the savings in cost of inspection and lowering of customer rejection rates which have been achieved by small operators who have instituted control efforts. —p. 74

PACKAGING KNOWLEDGE VITAL—Specifications for packaging metal parts for the military services' field requirements are spelled out in considerable detail, usually in the fine print of contracts. They may involve substantial expense, in the form of cleaning, rustproofing, preservatives, specially treated wrappings and boxing for shipment, which has been known in some cases to exceed the cost of the parts themselves. Prospective defense contractors are urged to take particular cognizance of these "tremendous trifles" when entering bids, to avoid having to "take the wrap" for a loss. —p. 70

FASTER ARC WELDING—Shielded-inert-gas-metal-arc (sigma) welding, a process now about three years old, has found successful application on aluminum, stainless steel, copper and copper alloys. Laboratory studies indicate interesting possibilities in the field of carbon steel. Sigma process characteristics include high current densities, consumable electrodes and argon or oxyargon atmosphere around the weld. —p. 75

CUT COBALT TO LIMIT—Progress has been made by the porcelain enamel industry in cutting cobalt requirements. Formerly 2.2 pounds of cobalt per ton of steel was the average; this has dropped to 1.3 pounds per ton. Further reduction is claimed impossible without raising serious manufacturing difficulties.

FLUID RHEOSTATS—Motors, two of them exceeding 65,000-hp rating, for powering a new wind tunnel at the Arnold engineering development center at Tullahoma, Tenn., will be controlled by liquid rheostats under construction at a Buffalo Westinghouse plant. Each rheostat is more than 20 feet high, comprising three 9-foot tanks in which an alkaline solution is circulated. At the base of each tank is a stationary nickel-clad steel plate. A similar electrode is attached to a movable plunger-like support at the top, current passing from one electrode to the other through the solution, the closer the electrodes the more current flows.

MAGNETIC RAM DOES IT—In assembling a steel cup to a zinc die cast protector cap for Navy rockets, the shallow cup is press fitted into the top of the casting, with a sealing compound applied on the edges. To position the cup accurately, permanent magnets are set into the ram of the press and hold the steel part firmly as it is driven home.

STILL DICKER ON THREADS—Encouraging progress is being made on Unified Screw Thread Standards, although there are differences yet to be resolved between American and British aeronautical practices in sizes below ¼-inch to achieve interchangeability of screws used to attach small components such as instruments to a major assembly. The subject was explored recently at a London conference of A-B-C representatives. —A.H.A.

Metalworking Outlook—p. 33 *Market Outlook—p. 133*

Protruding edges of jeep clutch assembly previously dipped in preservative oil are covered with protective tape to prevent puncturing the final package.

Dessicant made fast to clutch absorbs moisture trapped in final package. An indicator is added to show its effectiveness. Polyethylene coated kraft paper prevents oil seepage.

Watch Packaging Specs in Figuring

Costs of processing and protecting metal parts for overseas shipment or long-term storage may be higher than value of piece manufactured. Your company can take a substantial loss if insufficient attention is paid these requirements

MILITARY contracts may look like pots of gold at the end of the rainbow especially if you can't get enough metal to sustain normal civilian production. The average metalworking company probably will have to devote at least part of its capacity to military or defense work in the coming months to keep its plant operating near capacity.

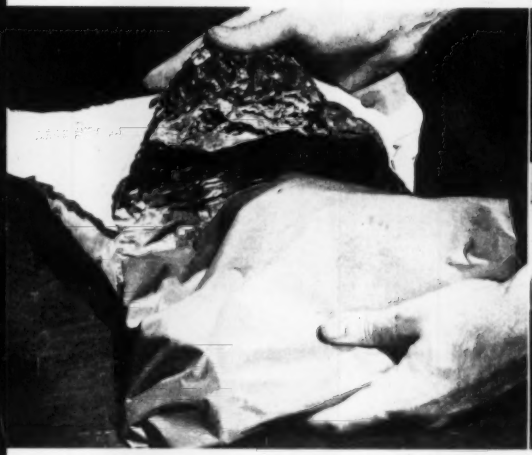
But there is a joker in the deck for the company that fails to look over carefully invitations to bid. Military packaging requirements may turn a contract bid into a substantial loss, particularly for a small firm inexperienced in such dealings.

Take a Good Look—Your company may be experienced in making parts similar to those called for in a military contract—but take a good look at the packing and packaging specifications before entering a bid. Here's how an Ohio aircraft parts manufacturer took a sizable loss: A quick look at the invitation to bid revealed that domestic packing was called for and so a low bid allowing for a moderate profit was entered. Close scrutiny would have given vital information as to the prescribed packaging method and boosted the bid considerably. In its eagerness to get a contract representing a large volume of work, this company overlooked the processing and packaging requirements that added substantially to the total cost.

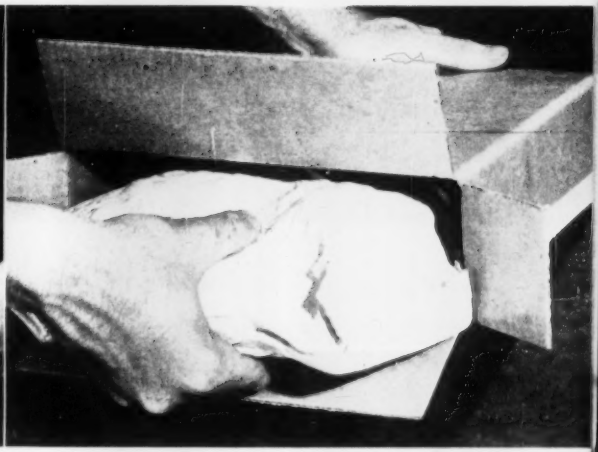
Manufacturing cost of steel dowel pin used in the barrel and receiver assembly of an M1 service rifle is 3.5 cents. It costs 17 cents to treat this pin with preservative and enclose it in an aluminum foil lined paper envelope. The packaging requirement is tough because the pin must fit perfectly when issued as a spare part in the field even after lengthy storage. Not all military spare parts cost four or five times as much to package as to manufacture but the above example is duplicated on a variety of parts.

Losses Whittled Down—In 1942 only 45 per cent of materiel arriving overseas was in usable condition; by 1945 this figure climbed to 75 per cent and the Defense Department hopes to raise this total to 95 per cent soon. These figures clearly indicate that the thinking of military and industrial packaging experts is directed in the right channels. From the standpoint of cost, time and military considerations, we can't afford to duplicate the 1942 shipments' losses.

Experiments are continually in progress at the packaging development branch of the Engineer Research and Development Laboratories, Ft. Belvoir, Va., to prevent materiel from being damaged in shipment because of faulty containers and to stop internal damage by corrosion, fungi or because of improper processing before shipment. In addition the Naval Research Laboratory and the Air Materiel Command have a number of projects with the same general



Moisture vaporproof laminated foil envelope serves as final protective wrap. Jaw-type heat sealers are used to close the open end and make long-term storage possible



Clutch is placed in carton prior to insertion in wooden shipping case. Cushioning material fills out the pack. Photos courtesy Dobeckmun Co.

Military Contracts

By ED KARPICK
Associate Editor

MILES of hiking down Pentagon corridors and conferences with military and industrial packaging experts pointed up this problem facing contractors working on military jobs

aims. After a container or a packaging technique is "put on the rack" in the laboratory further tests are conducted in the field since that is where the final stamp of approval must be applied.

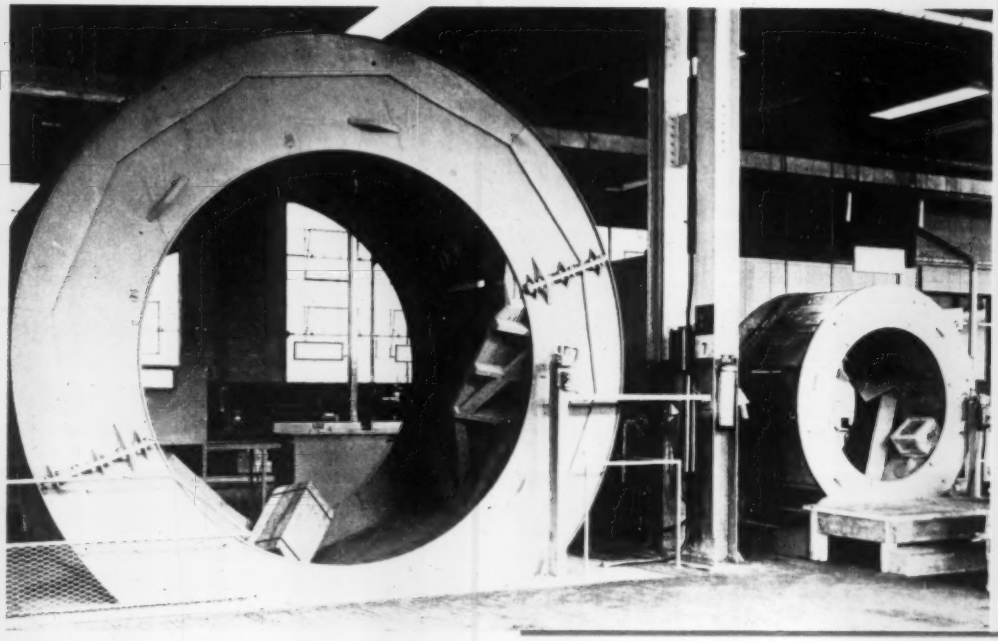
Only the Rugged Survive — At Ft. Belvoir containers are given vibration tests, a revolving hexagonal drum test to determine ability of the container to withstand rough handling, an incline-impact test, external compressive load tests and submersion in a water tank. Facilities of two climatic laboratories permit running tests to duplicate either tropical or arctic conditions; temperatures can be raised from minus 65 to 196° F in 6 hours. Accelerated weathering machines aid on-the-spot investigations.

A processing line for duplicating many steps performed in industry includes: Facilities for rust removal by means of heated acid bath; cleaning by steam, emulsifiable solvents, alkaline bath or by petroleum solvent bath; infrared oven drier; fingerprint neutralizer; ethyl-cellulose and acetate butyrate strip coating tanks; preservative compound tanks; tanks for dip-coat sealing; and complete facilities for wrapping, packing and packaging.

This facility makes important contributions in determining exactly the kind of processing that will be applied to parts after manufacture, kinds of wrapping used and the shipping cartons required. Through these tests new container designs are evolved not only to make crates and cartons stronger but lighter. Overpackaging is not a rare occurrence and in several instances the weight of crates tested exceeded that of the equipment. With present plans calling for an increasing volume of military materiel to be transported overseas and supplied to combat troops in the field via air, savings in container weight that can be made without sacrificing strength are of great importance.

Learning the Right Method—All this research and development is of no avail if there aren't enough trained personnel around to make use of the materials available. A packaging school is being conducted at the Rossford Ordnance Depot in Toledo, O., to train military and civilian packagers. Industry trainees are limited by the facilities available and are invited from firms that have military contracts. About eight industrial trainees can be handled per two-week course at the present time but the facility is being enlarged to accommodate more. Still in the discussion stage is a plan to set up additional schools in other geographical areas.

If you are shopping around for military contracts, you may want to arm yourself with these volumes: Indexes of Specifications and Standards used by the Munitions Board Standards Agency, Department of



Hexagonal drum test is only one form of torture to which shipping containers are subjected at the Ft. Belvoir packaging laboratory

the Army, Department of the Navy and Department of the Air Force (Military Index Vols. I, II, III and IV). The first two volumes may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington for $2.75 each. The Navy index may be obtained without charge from the Navy Purchasing Office, Bureau of Supplies and Accounts, Navy Department, Washington. The Air Force, too, makes no charge for its publication which is available from the Commanding General, Wright-Patterson Air Force Base, Dayton, O.

Listed in these volumes are the hundreds of specifications pertaining to items procured by the respective departments and the agency within the department that is custodian for the detailed specification. Examples of custodian agencies are: Ordnance, Engineers and Quartermaster Corps in the Army and Bureau of Ships, Ordnance or Aeronautics in the Navy.

If your company bids on a subcontract for supplying parts to be used by a prime contractor in assembling a major military item then you'll have few packaging problems. In most instances the shipment has to be made in accordance with accepted commercial practices. This may also be true on some parts going to Ordnance or other military storage depots where the parts will be treated and packaged by personnel attached to these activities.

Watch Your Step—Contracts for spare parts and a variety of other items aren't as easy to handle. First, of course, you have to determine a unit price for making the item, then figure how much to add to your bid for packaging and packing in order to be able to handle the job at a profit. The latter is tougher for most companies. Manufacturing operations are not much different in the majority of contracts from those performed on civilian products but packaging requirements can be and often are vastly different.

Extensive use is made of barrier materials and preservative compounds in packaging metal parts. Volatile corrosion inhibitors combined with barrier materials promise to be of great importance but cannot be used except on certain Air Force contracts at present.

Tools of the Trade—Method I packaging of gears, pins, shafts and similar metal parts generally calls for using a two-solvent cleaning method including a fingerprint neutralizer and application of preservative compound, either quick drying or nonsolidifying types. The part is then wrapped in a grade A greaseproof polyethylene coated paper or barrier material. Sharp or protruding edges are covered by two thicknesses of grade C type I cushioning. This material is essentially cellulose acetate film coated and combined to scrim cloth with a heavy coating of microcrystalline wax. If the contract does not specify the exact number of pieces to be placed in a carton, the general rule of not more than 50 pieces, weighing not more than 25 pounds (whichever is the smaller) applies. Parts packaged for overseas shipment fur-

ther require an overlap with grade C type I material and sealing with a hot wax dip.

Materials such as electric motors, electronic equipment, bearings, etc. that would be damaged by oils or greases get a method II pack. These items are wrapped in a heat sealing barrier material consisting of a vinyl film laminated to an aluminum foil which is in turn laminated to polyethylene film and then to scrim cloth. Silica gel crystals are added to keep humidity level in the package below the point conducive to corrosive action.

New and Promising—Rust preventives covered by specification MIL-P-3420, Packaging Materials, Volatile Corrosion Inhibitor Treated, have only limited service acceptance, primarily for Air Force use. An article appearing in *Ordnance*, September-October issue, gives the background leading to the development of this family of inhibitors and results of tests made on dicyclohexylamine nitrite patented by Shell Development Corp. and designated VPI (vapor phase inhibitor). Although both laboratory and field tests make this packaging method a "hot" item, it cannot be used in filling Ordnance or Navy contracts.

Lower packaging costs, easier and cheaper cleaning and long-term protection are some of the advantages accruing from using volatile corrosion inhibitors. Officers and men who have cleaned weapons coated with heavy "gunk" in the field form a cheering section for this preservation method but some military channels feel further testing is necessary before full approval is granted.

There are several companies manufacturing products that fall into this general classification. Most of the military experience has been with VPI since the other firms' products have not completed the required year of field tests. Laboratory experiments indicate that the other products will do the job required. So far inhibitors in this family group are recommended only for ferrous metal preservation until such time as the effects on nonferrous metals can be further appraised. Commercial uses of this protective method are growing rapidly.

Many metalworking companies are faced with the problem of deciding what to do about their packaging and packing after they have read the applicable specifications. Smaller concerns often do not have the facilities to handle this work and even larger plants sometimes do not have a sufficient volume on a particular military order to economically justify setting up a packaging line for this work.

Give It to an Expert—One solution is to farm out this work to packaging specialists. There are a number of packaging plants in all metalworking centers that will handle these jobs on a subcontract basis. The contracting firm must ascertain that the packagers are capable of doing the job right because it can assign rights under the contract but not responsibilities. Not every organization that hangs out a sign is capable of meeting contractual obligations.

Fortunately most packaging firms are reliable small business concerns, and are as zealous in maintaining their work standards as are the manufacturers. An additional safeguard in selecting a packaging specialist can be used by checking with a district Ordnance or Navy inspection office. The government packaging specialists maintain lists of approved installations and will refer interested manufacturers to these approved concerns upon request. Whenever new packaging concerns are organized they are added to Ordnance lists after a thorough inspection of their facilities.

The packaging firms often assist metalworking companies in preparing their bids on an item by placing a specific price for processing, packaging and packing said article and enabling the contractor to enter a reasonable bid. Even these specialists branch out in definite lines like electronic instruments or large machinery. By confining their operations to fewer items, these companies can hold down costs and assure their customers of a job that will pass inspection without difficulty.

Here are a few precautions to observe before bidding on a military order: Examine the packaging requirements carefully to see how much they will hike costs; don't be blinded by the size of the contract. Get familiar and keep current with the packing and packaging requirements that apply to items within the scope of your plant's manufacturing processes. Make a cost study to determine whether it is cheaper to do the job yourself or have it done by a packaging specialty firm. Check with your military contracting officer before subcontracting your packaging to a firm you know nothing about.

At the left an M1 service rifle is protected by "gunk" as is the current practice. Volatile corrosion inhibitor still undergoing study by the military and a laminated foil envelope did the job on weapon at the right

QUALITY CONTROL . . .

It Works in Small Plants, Too

By JOHN S. MORGAN
Associate Editor

"STATISTICAL quality control? High brow stuff . . . all right for the big boys who can afford to hire experts to put it into practice, but we're too small to be able to use it."

That's the typical reaction to quality control from many smaller metalworking companies who know nothing about it or who know a little but have heard of cases where its use has backfired. What's the real story? Can a statistical control system on quality be used economically and effectively in a small company?

Yes, Again Yes—"Yes," says Wade R. Weaver, Republic Steel Corp.'s director of quality control and president of the American Society for Quality Control. "Yes," says Lundberg Screw Products Co., a Lansing, Mich., firm which has a successful statistical control program now operating although it employs only 165 production workers.

"Two factors," says Mr. Weaver, "make many companies shy away from quality control: Lack of understanding of the system's principles and the circumstance that many of the users of quality control who have turned sour on it have been small firms." That latter factor results because smaller companies have been prone to adopt quality control with an inadequately trained man supervising the job, not because statisical controls don't apply to the little fellow. "Actually," Mr. Weaver points out, "it is more readily adaptable to the small company because the statistics are less complex, the operations simpler than in a large firm. The little company should have a trained man to supervise the job, but he need not have the education and experience required of a man supervising a big company's system."

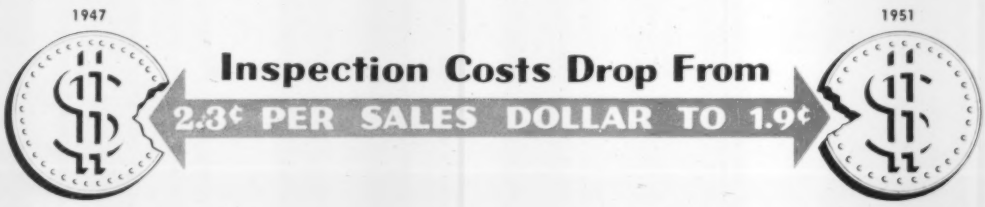
Iowa Start—Lundberg's quality control system had its start when the company president and general manager, H. B. Lundberg, first saw it used five years ago in John Deere Co.'s Waterloo, Iowa, plant. "It looked simple," he recalls, "and we immediately took steps to adopt a system like Deere's." Deere had a few machines working on its own parts in continuous operations. The exact Deere system did not work out too well at first in a screw machine product job shop like Lundberg's, but the company experimented, adapted, revised and expanded in an evolution that's still going on.

Lundberg's system was put in charge of Chief Inspector Robert D. Muir. He uses various forms of the control system in about a third of his company's manufacturing operations. A fraction defective type of program is used in the automatic screw machine departments. It is just being inaugurated and is based on a batch-type of control using Lundberg's own sampling acceptance tables. Fraction defective charts are maintained on each automatic machine. That same type of control is also used in the heat treat department. Lundberg expects eventually to extend that type of statistical sampling into all second-operation departments. The company also uses Average-Range charts, Lot-Plot charts and Machine Capability studies throughout the plant on selected problems. Inspectors sample every lot before shipment, using a double sampling procedure. Lot-Plot charts are also used in final inspection acceptance of certain critical items.

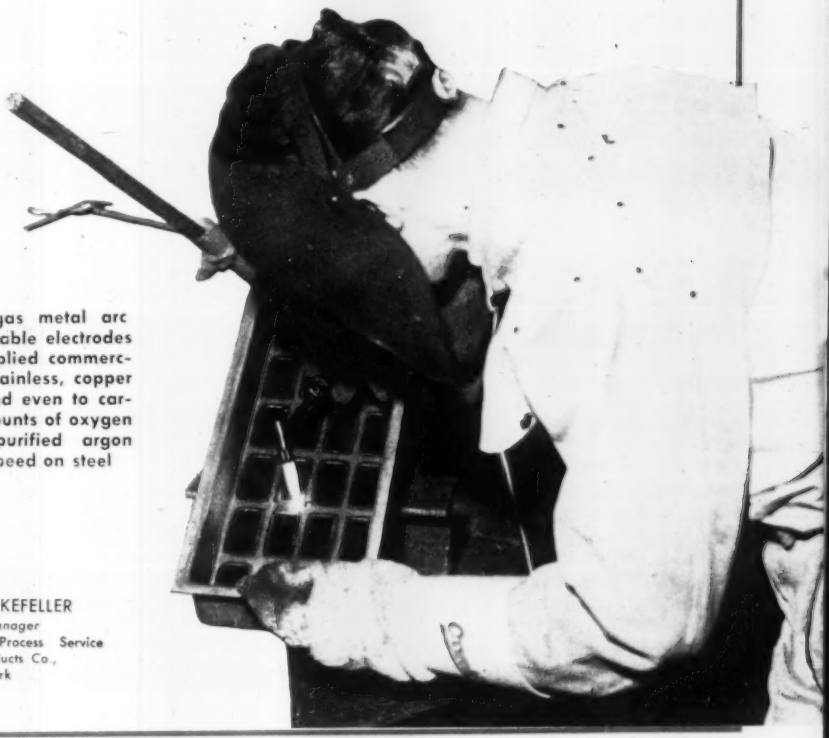
The Proof of the Pudding—How has a smaller company such as Lundberg made out with quality control in the five years it has been using it? In the spring of 1947, its production and scheduled working hours were comparable to the performance this year. A March-April check in both years (see pictogram) shows that inspection costs have dropped 0.4 cent per sales dollar in four years. That decrease comes in spite of adding a gage section, an inspection group leader and a skeleton final inspection group on the night shift.

Inspection costs are down, yes, but how about that essential customer rejection rate? A company analysis shows that in the same 1947 and 1951 periods, Lundberg's rejection ratio dropped from 3.8 per cent to 1.1 per cent. That lower figure is further minimized by the fact that the customer today is much more rigid in enforcement of his specified quality requirements than four years ago.

Patience—Any company—big or little—must expect a long period of evolution in working out a successful control program, Lundberg believes. But the system can be set up with a minimum expense that will soon be amortized as the preceding inspection costs have revealed. But at (*Please turn to Page* 90)



Sigma Welding Applications Expand



The shielded inert gas metal arc process using consumable electrodes is currently being applied commercially to aluminum, stainless, copper and copper alloys and even to carbon steel. Small amounts of oxygen added to highly purified argon increase welding speed on steel

By H. E. ROCKEFELLER
Assistant Manager
Development and Process Service
Linde Air Products Co.,
New York

This small nonwater-cooled torch was developed for welding light materials. Current capacity about 75 amp

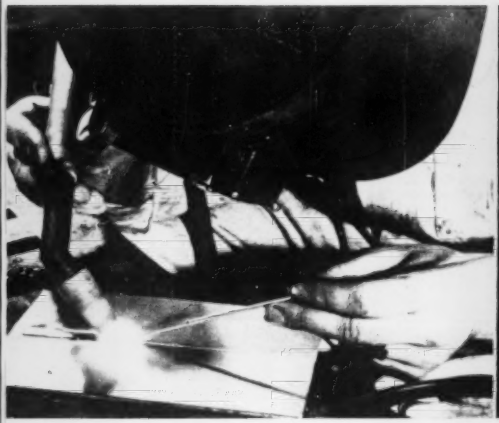
INERT gas shielded arc welding, which includes the use of a consumable as well as a nonconsumable electrode, has, in slightly over a decade, become one of the major fusion welding methods. For the nonferrous and "difficult to weld" metals, it is rapidly becoming a preferred fusion welding method. It has not only largely replaced other methods, but has permitted fabrications hitherto impracticable for welding.

The nonconsumable electrode type of inert gas shielded arc welding, named "Heliarc," was first commercially established in California in 1940 by the Northrop Aircraft Inc. for their own application in the welding of magnesium for aircraft fabrication. Recognizing the possibilities of this process, Linde, in 1942, acquired the Northrop invention, and initiated an extensive research and development program to expand use of the process. In the initial investigations, it was established that argon offered several advantages over helium as a shielding gas. Argon being approximately ten times as heavy as helium gave more complete protection at a considerably lower gas flow.

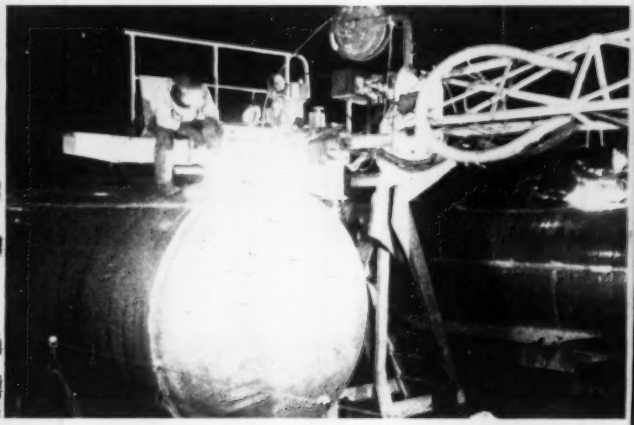
First Application, Aluminum — Aluminum offered one of the broadest fields of application and much of the early research and development effort was devoted to establishing suitable Heliarc welding conditions for the metal. With the direct current welding used by Northrop in welding magnesium, satisfactory results could not be obtained with straight polarity and electrode heating with reverse polarity materially reduced the welding speed obtainable. A good cleaning action was obtained in reverse polarity welding which effectively removed the aluminum oxide when using argon.

Through the use of alternating current welding, a satisfactory compromise was established in that the reverse polarity cycle provided the cleaning action and the straight polarity cycle improved the heat input to the weld with consequent material increase in welding speed and higher current-carrying capacity for the electrode. By superimposing a high frequency current on the welding current the arc could be established without touching the metal. This eliminated contamination of the electrode and also stabilized the arc during the welding operation.

In the Heliarc welding of all other metals except



First water-cooled torch using a water-cooled cable and ceramic cup. Maximum capacity 300 amp



Sigma welding aluminum tank cars, with equipment of the fully automatic type

magnesium and aluminum bronze, on which alternating current is also preferred for most applications, direct current straight polarity generally provides the most satisfactory and efficient power source.

Enter Sigma Welding—In 1948 the "shielded-inert-gas-metal-arc" process was introduced by the Air Reduction Co. This process employs a consumable electrode. The electrode is continuously fed from a rod reel similar in principle to submerged melt welding except that the inert gas replaces the granular welding composition.

The shielded inert gas metal arc process, called "sigma welding" from the initial letters of the five words, was applied first to aluminum. Subsequently it has been commercially used on stainless steel, copper and copper alloys including silicon and aluminum bronzes, and even on carbon steel. The process is less than three years old and can still be said to be suffering somewhat from growing pains. Largest commercial use at present is in the flat position welding of aluminum. On this application, and with argon as the shielding gas, quality comparable to that obtained with the Heliarc process is readily secured, particularly with fully automatic equipment. On stainless, copper and copper alloys, argon gives excellent weld quality and deposition control. With argon, a more stable arc can be maintained with a lower gas flow and much less spatter. Considerably higher rates of metal deposition can be made in sigma welding.

Distinguishing Characteristics—Several characteristics in inert gas shielded arc welding distinguish this process from other fusion welding methods. Furthermore, certain fundamental differences exist between the nonconsumable electrode (Heliarc) method and the consumable electrode (sigma) method.

Probably the most important characteristic common to both techniques is the elimination of flux and resulting slag. Fluxes required by other processes for welding aluminum, magnesium and some other metals contain constituents which are corrosive to the base metal if not removed after welding. Their removal from the weld surface adds cost to the overall fabrication. Such removal is often difficult and for certain joint designs, impracticable.

Another important difference in inert gas shielded arc welding is the characteristic higher current density employed. In Heliarc welding average current density recommended is about ten times that for carbon arc welding, and about three times that for coated metal arc welding. In sigma welding the current densities employed average at least twice those used for Heliarc. This permits use of an exceedingly high heat concentration with a consequent ability to secure deep penetration, narrow welds, a smaller heat-affected zone, and reduced distortion.

No Filler Wire—In Heliarc welding, use of a nonconsumable electrode permits joining of metals without the addition of filler wire at generally lower costs and with less distortion than with oxyacetylene, atomic hydrogen or carbon arc welding. Where filler wire is required the placement of the weld metal in butt welding can be more accurately controlled than in the coated electrode or sigma welding, and finishing costs may be reduced when smooth finishes are required. This characteristic of separate control of heat input and addition of filler metal also permits better control of the elimination of gases which may be evolved from the base metal during the welding operation.

In sigma welding, on the other hand, a better heat transfer efficiency is obtained because the added metal is carried over in the molten state in the arc stream rather than heated from the nonconsumable electrode or molten puddle. Current densities are not limited by the melting temperature of the tungsten electrode. These characteristics result in higher rates of metal deposition, lower costs and higher weld zone cooling rates. Quality of the deposited metal is more difficult to control because of the critical nature of the manner of metal transfer.

For best welding conditions, metal transfer con-

sists of a series of discrete metal droplets propelled at a high velocity. This droplet formation varies for different metals and for different current densities. Commercial growth of sigma welding may well be determined by the extent to which the droplet formation can be controlled.

Oxygen Speeds Process—The droplet rate, particularly on stainless and carbon steels, can be materially increased by the addition of small percentages of oxygen to a highly purified argon. Droplet rate in this oxyargon mixture has been as much as 50 times greater than in an atmosphere of pure argon, other conditions being the same. This greatly increased droplet rate, with no change in current density, permits welding at higher speeds without undercutting. Coalescence of the weld metal is improved at increased welding speeds. Overhead welding of stainless steel is made practicable.

On the other hand, the oxyargon mixture permits welding at lower current densities. This means that larger diameter, more economical rods may be used for a given welding current. If the same size rod now available is used, then thinner materials can be welded.

Welding Aluminum—The most extensive use of the inert gas shielded process to date has been on aluminum and its alloys. Prior to the introduction of Heliarc welding, oxyacetylene or oxyhydrogen welding was employed for most sheet metal and light plate fabricated by butt welding. Carbon arc was in use for mechanical welding of the heavier plate material, and metallic coated electrode welding for structural joining and some butt welding.

Sigma welding has replaced Heliarc on certain of the butt welding applications and metallic arc on certain structural weldments. These two variations of shielded inert arc welding have also encouraged the fabrication of aluminum on applications for which no other method would have provided either the required quality or economy.

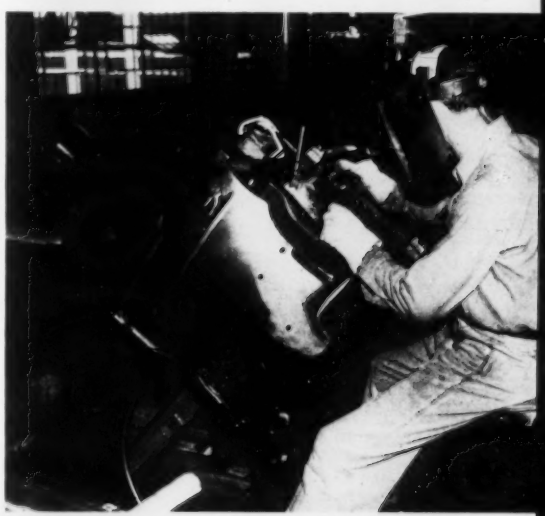
History of welded fabrication of aluminum tank cars furnishes a good example of the advances in aluminum welding. The first tank cars were fabricated by oxyacetylene welding. This process was later replaced by mechanized carbon arc welding, which then gave way to Heliarc welding. Within the past two years, Heliarc welding, in turn, has been replaced largely by sigma welding.

Costs Down—While overall cost comparisons must include a number of factors other than direct welding costs, the comparisons given in the accompanying table are significant in illustrating the possible savings of sigma welding in the fabrication of relatively heavy aluminum plate by butt welding.

Reasons for replacement of Heliarc with sigma welding are largely dictated by cost. However, for fillet welding, the sigma process has the added advantage of improved penetration. Quality, on the other hand, still remains the dominant factor on some applications. In sigma welding the problem of controlling porosity has not been completely solved but equipment and process developments are providing suitable answers on selected applications. When this is accomplished sigma welding will undoubtedly become the most economical fusion welding method on all applications of aluminum where the addition of filler metal is a requisite.

Welding Stainless—In the stainless steel field, Heliarc welding has largely replaced oxyacetylene and metal electrode welding on light gage material. This is primarily due to lower distortion compared to gas welding, and to lower finishing cost compared to metal electrode welding. Heliarc welding offers a quality advantage over other processes in that there is no loss of stabilizing or other elements and no carbon pickup. Additionally, this process provides a latitude in welding certain compositions which have not been satisfactorily welded by other processes. The process may be more costly than metal electrode welding in applications on materials over $\frac{1}{8}$-inch thick where other factors do not compensate for the deposited weld metal cost.

Welding Copper and Copper Alloys—Copper and copper alloy welding seems to be following the same general sequence in preferred welding method that has occurred in the case of aluminum. Satisfactory welding procedures have been developed both for Heliarc and sigma welding and the advantages are relatively the same. Because of the high heat conductivity common to copper and copper alloys, the rapid heat input rate associated with the sigma process shows particular advantage over the Heliarc process in the heavier gages. With the sigma process very satisfactory welds have been made in the thicknesses up to $\frac{1}{2}$-inch without preheat. A particularly interesting application is the repair of a massive 7000-pound cast copper mold. As frequently happens in preparing such molds, a defect was uncovered in machining. This was repaired by sigma welding using a hand torch with a preheat of 500° F. A welding



Heliarc process being used in the welding of automobile fenders

current of 400 amp effected a very satisfactory repair.

Welding Carbon Steels — The welding of carbon steels has, of course, dominated the application of fusion welding. Statistics show that over 95 per cent of all fusion welding is applied on carbon steels. In the Heliarc field considerable application has already been made for certain sheet metal weldments. In the automotive industry particularly, the process is applied to welding fenders, body joints, bumper guards, bumpers and other accessory parts requiring metal finishing. The process has found acceptance in this field because the welds could be produced at high speeds with no porosity, slag or spatter, a minimum of reinforcement, controlled distortion, and low costs.

Tungsten arc semiautomatic rod feed and automatic welding devices will increase the use of the process materially. Speeds of 80 to 100 inches per minute on 20-gage material appear to be entirely practical. Competition is extremely keen in this field, and because of cost, Heliarc welding will probably be limited to applications where finishing or some other factor favors this process in the overall cost consideration.

Field for sigma welding carbon steel is as yet unknown, but sufficient laboratory work has been carried out to establish that sound welds can be produced, and at speeds that should provoke considerable commercial interest.

COST COMPARISON
HELIARC VS. SIGMA WELDING

Costs for 100 Ft. of ½-In. Aluminum Plate

	Heliarc	Sigma
Welding Rate, in. per min. per pass	10	12
No. of Passes	3	2
Duty Factor, %	40	70
Argon Used, cu. ft.	1125	335
Rod Used, lb.	14	6
Labor at $2.00 per hour	$ 30.00	$11.40
Gas Cost	112.50	33.50
Rod Cost	10.40	4.68
Power and Miscellaneous	1.00	.75
TOTAL	$153.90	$50.33

From data presented by the author at the 1951 Western Metal Congress, Oakland, Calif.

Automatic Stopping Devices Speed Fatigue Tests

SEVERAL devices recently constructed at the National Bureau of Standards are proving valuable in speeding mental fatigue tests. Auxiliary test equipment includes devices for stopping the testing machine when a small crack forms in a specimen, apparatus for the uniform polishing of fatigue test specimens, and a machine for fatigue-testing thin sheet specimens in bending.

Stopping the Test Machine—One commonly used fatigue-testing machine applies a bending moment to the specimen, simultaneously rotating it so that every point on its surface is subjected to a cycle which goes from tension to compression during each revolution. Mounted on standard commercial testing machines, the two NBS stopping devices respond to changes in the specimen stiffness when a small crack forms.

In a typical machine the specimen of 0.25-inch minimum diameter is drawn into spindles in bearing boxes, supported at the ends away from the specimen and loaded at the ends near the specimen by weights hung on shackles. This loading results in a deflection of the bearing boxes, and the deflection increases when a crack forms in the specimen. If the crack is only on one side of the specimen, the deflection will vary periodically with each revolution of the specimen; in other words, the bearing box will vibrate. Both the deflection and vibration are used to actuate stopping devices; one device is deflection-responsive and the other is vibration-responsive.

The NBS deflection-responsive stopping device consists of a microswitch operated by a lever. The lever is fastened rigidly to one of the bearing boxes, and at the other end carries an adjusting screw which bears on the actuating leaf of the microswitch. After the machine has run long enough to reach the temperature equilibrium, the adjusting screw is advanced until a minute change in the position of the lever will trip the microswitch and shut off the machine.

Ball on Pedestal—The vibration-responsive stopping device, which is fastened rigidly to one of the bearing boxes, consists of a steel ball poised on a three-pronged pedestal. Vibration resulting from an incipient crack in one side of the specimen shakes the ball from its perch; in falling, the ball closes an electrical circuit that shuts off the machine. Sensitivity of the device may be adjusted by varying the distances of the pedestal prongs from each other.

Apparatus for Polishing—Surface condition of test specimens has an important effect on fatigue and must therefore be made as uniform as possible. Two pieces of apparatus developed at NBS, both entirely automatic, make possible close duplication of the polishing operation from one specimen to the next.

Two types of specimens, smooth and notched, are used in NBS fatigue tests. The machine for finishing smooth specimens consists essentially of three parts—a wheel carrying an abrasive belt, a means for supporting and rotating the specimen during the polishing operation, and a means for moving the specimen across the abrasive belt during polishing.

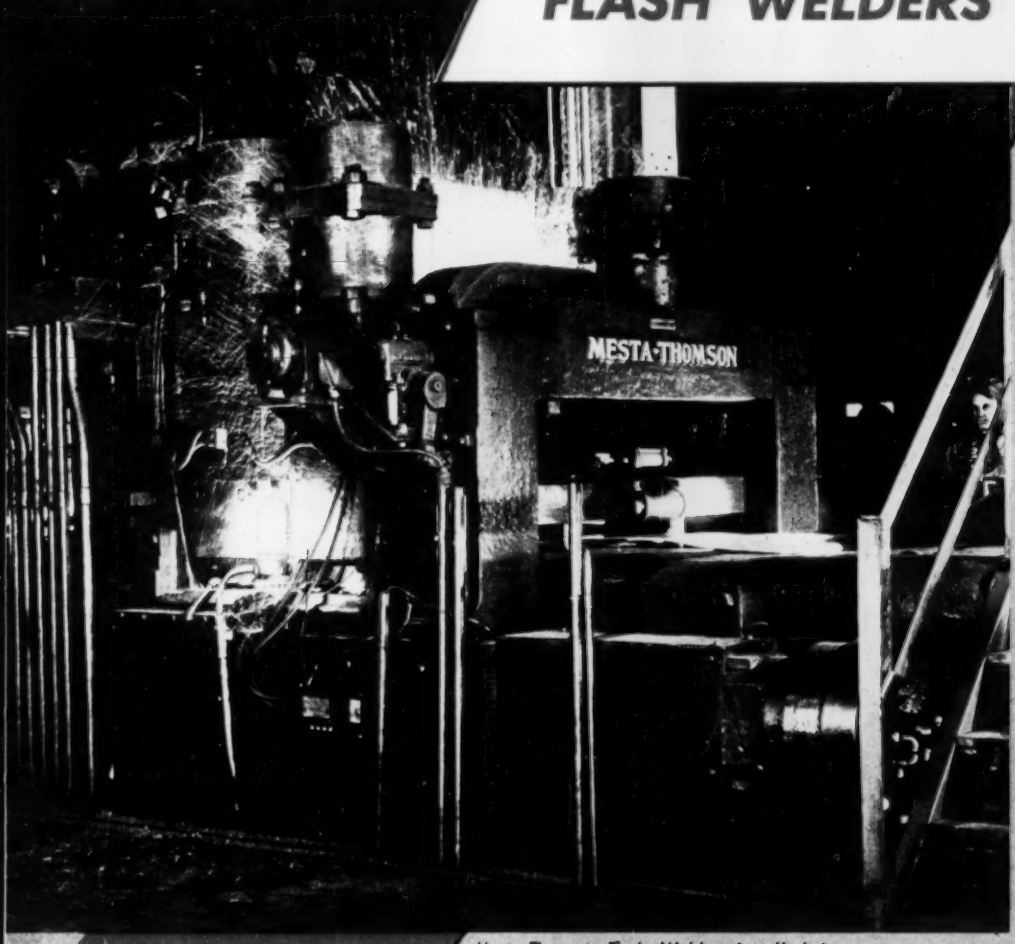
The wheel is distinctive in consisting of a large number of metal spring leaves, radiating outward from a hub, which press against the abrasive belt. This arrangement conforms the abrasive belt to the contour of the specimen and assures uniform pressure.

The apparatus for finishing notched (filleted or grooved) specimens is new only in a few details. It consists essentially of an abrasive-charged wire which rotates against the bottom of the notch while the specimen is slowly rotated.

Testing Thin Sheet—Because of the large deflection required, sheet metal of less than about 0.015-inch thickness cannot be fatigue-tested in bending on commercially available testing machines of the cantilever type. By deflecting the specimen as a column, a newly-developed NBS fatigue-testing machine makes possible the bending of specimens to a small radius of curvature without large amplitudes in the drive mechanism.

Increase

Cold Mill Production with . . . MESTA-THOMSON FLASH WELDERS



Mesta-Thomson Flash Welder installed in a Mesta High-Speed Continuous Pickling Line

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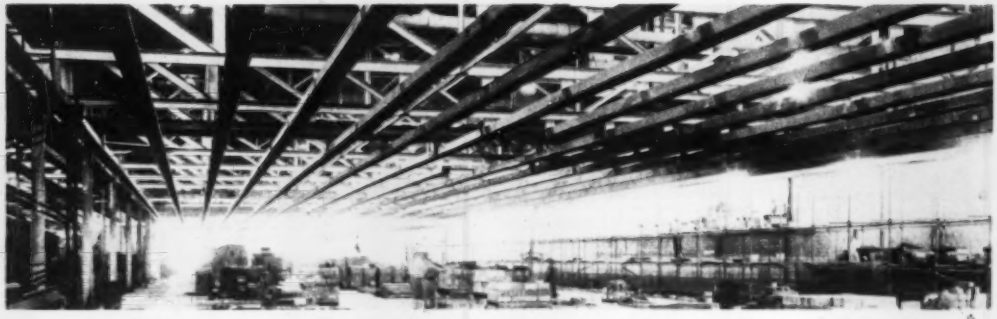
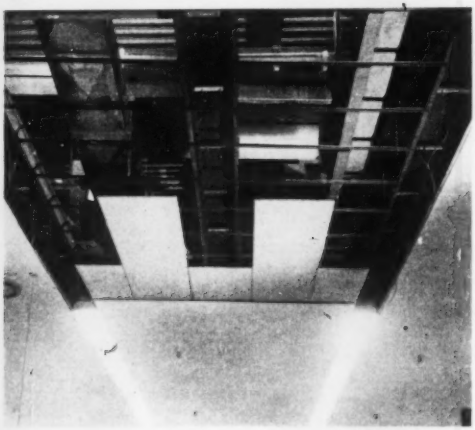


Troffer beams form the structual core of the integrated ceiling-lighting system. Beams accommodate wiring and lighting fixtures and provide structural support for suspended ceilings and for duct work, piping and other facilities above the ceiling

"Troffer Beams" Support Integrated Ceiling-Lighting System

AN INTEGRATED ceiling-lighting system type of construction developed by Austin Co., Cleveland, and introduced at a new midwestern plant provides a simple means of installing fluorescent lighting systems in industrial plants, offices and other buildings —particularly where preformed acoustical ceilings are installed. Use of the new system resulted in a net saving of more than 40 cents per square foot. Installation involved the use of approximately 90,000 lineal feet of "troffer beams" spaced on 5-foot centers throughout the manufacturing area.



Three troffer beams are shown here, two with continuous fluorescent lighting units already installed on either side in the background and one in the center without lighting

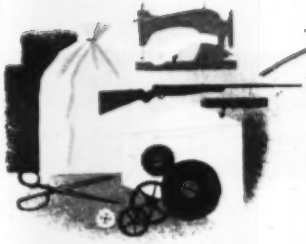
Troffer beams are trough-like structures of heavy gage sheet steel which besides serving as structural support for the ceiling installation, also become the raceway for the fluorescent lighting fixtures. The beams are spaced 3, 4 or 5 feet on centers for the support of the ceiling.

The desired level of illumination determines whether every or every second troffer beam is to be equipped with lighting fixtures. In this manner a wide range of illumination intensities may be covered. In most cases the fluorescent lights would be located 8 to 10 feet apart with the intermediate troffer beams covered over with ceiling tiles. If, after an installation has been made, changes in occupancy make it necessary to increase the intensity of the lighting system, ceiling tiles directly underneath the intermediate troffer beam can be removed and fluorescent lights with reflectors installed.

The beam is fastened to the supporting truss or roof beam with clamps, so that it is not necessary to drill or punch holes in the structural members. While normally the beams would be at right angles to the supporting beams or trusses, beams can be run parallel to the main roof trusses or beams, or even diagonally to them.

The troffer beam can carry ceiling loads, cat-walks, electrical conduit and other building service piping. In a physical test of the troffer beam at the Austin research laboratory, a concentrated load of 1600 pounds was placed in the center of a 20 foot span with a deflection of only $\frac{5}{8}$-inch. Upon removal of this load the beam returned to normal position. This load is the equivalent of 160 pounds per foot uniform loading; when troffers are spaced 4 feet on centers this is a load figuring out to the equivalent of 40 pounds per square foot.

What'll You Have?



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HOT METAL CARS AND MIXERS

• • • *How Design Factors Affect Lining Life*

In the second of their series appraising refractories for handling hot metal, the authors discuss how equipment design, brick size, mortar quality and type of bricklaying all enter into determining how long linings will remain serviceable

PART II

By R. P. HEUER
Vice President

and

C. E. GRIGSBY
Service Research Engineer

General Refractories Co.
Philadelphia

SHAPE of hot metal cars and mixers has a pronounced effect on the life of the lining. In general, the best design is the one which has the best streamlining, with a minimum of corbels, jambs and right angle corners—especially at the ends and at pouring-in and pouring-out spouts of mixers. Streamlining design generally increases lining life by reducing the tendency of angular sections to wear rapidly.

Refractory consumption in the working lining of the mixer shown in Figs. 5 and 6 is 1½ to 1¾ pounds per ton of iron, with blast furnace-grade brick. A mixer of good design in the same plant uses only ½ to ¾ pounds of the same type refractory per ton of iron. Generally speaking, when lining life is very short, design changes alone will seldom yield any great improvement. Economics usually dictates a compromise between the ideal streamlined shape and a simpler, more angular contour, which permits maximum use of standard refractory shapes and a minimum of cutting on the job. Use of steel shelves, to independently support the mixer roof and upper end walls, (to permit sectional repairs), is increasing. Water-cooling of critical wear areas has been little used, although mixer designs are available having either cast wall or pipe coil coolers embedded in the refractory walls.

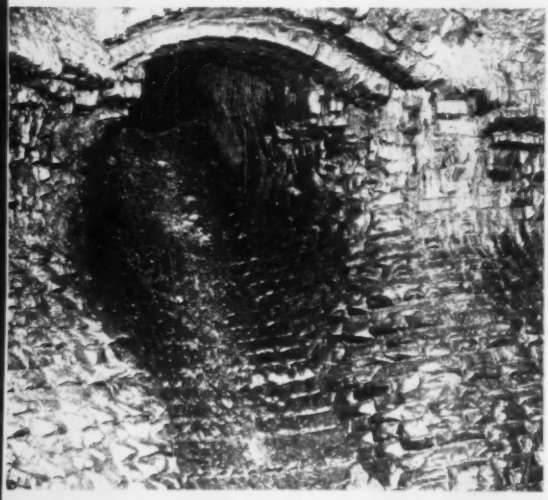

Fig. 5—Wear on jambs of pour-out spout of poorly designed 1300-ton mixer, in which end spout forces use of right angle jambs and gives long sweep of metal and slag along frontwall causing erosion such as shown in Fig. 6

Effect of Brick Size — There is an increasing tendency to use special brick of very large size (up to 36 x 12 x 4 inches in mixers), because they reduce the number of joints. Unless such brick are made by the slow, expensive air hammer process, porosity is higher and resistance to slag attack is lower than on smaller brick. Very large brick are also more likely to be warped and cost per unit volume generally goes up as size increases.

Use of brick 12 to 18 inches long, 6 to 18 inches wide, and 3 to 6 inches thick, may prove more economical than smaller brick in some hot metal cars and mixers. However when brick 24, 27, or 36 inches long are used, increased price per unit volume may be out of all proportion to the benefit obtained.

Effect of Mortar Quality — Best way to minimize wear at the joints, in hot metal cars and mixers, is to use a volume-stable mortar, made of a material having inherently greater resistance to slag corrosion than material of which the brick is made. When brick and mortar are of the same composition, highly porous mortar is penetrated more rapidly and deeply by the slag and—since it is more finely ground—is fluxed away more rapidly than the brick. Thus, joints become wider and deeper, and the end of the brick becomes correspondingly smaller—because the brick are soon subject to slag attack on five faces.

Thin films of iron, trapped in the enlarged joints when the vessel is turned, are then oxidized more rapidly, further increasing the rate of slag corrosion on all exposed faces of the brick. Eventually the end of the brick may become pyramid-shaped, knife-edged, or even shaped like the sharpened end of a pencil—

DURING the past twenty years ten world's records for one month's pig iron production have been established. Nine of the ten, including the present record of 54,336 net tons, were made by McKee-designed blast furnaces.

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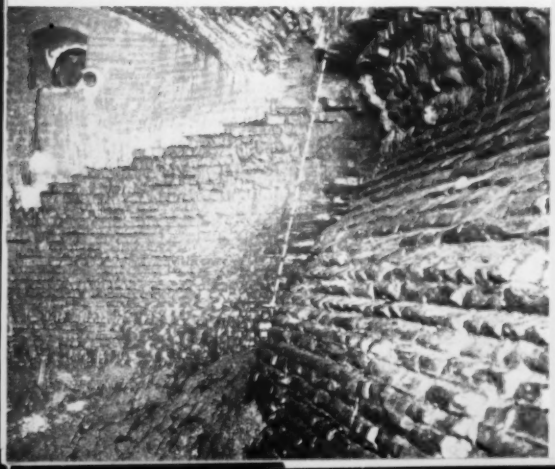
with the fire face little more than a point. The lining then resembles the mouth of a shark, full of rows of sharp teeth. This reduction of the brick's fire face is called "pencilling" and is typical of hot metal cars and mixers in which the mortar has less resistance to slag corrosion than the brick—as is usually the case. Figs. 7 and 8.

In addition to maximum resistance to corrosion by iron oxide, the mortar must also have a "just-right" degree of refractoriness to give the necessary hot strength to resist erosion by washing action of the metal. If not refractory enough, the mortar becomes soft; if too refractory, it develops insufficient ceramic bond. Thus, the best mortar, for any given ladle, is the one with the best balance of chemical and physical properties for the service conditions to be met. Since the mortar must be exactly suited to the temperature of each individual ladle, one ladle may require an entirely different type of mortar than another one using the same type of brick. In general, mortars which eliminate pencilling are more costly, but they usually prove most economical because they are used in small quantities as compared to brick. Thus, they greatly increase lining life, for a small percentage increase in total cost of refractories.

Effect of Bricklaying — Since pencilling of brick causes so much trouble in most hot metal cars and mixers, it is impossible to over emphasize importance of the thinnest possible joints. When using brick of standard sizes—as in the body of these vessels—all brick at the fire face should be wedges or keys, because arch brick are quickly loosened, and float out, if pencilling occurs. Generally speaking, bonded wedges should be used in the body of mixers, because keys increase the number of joints which are parallel to the direction of slag and metal flow, thus increasing pencilling. In submarine-type hot metal cars, choice between keys and wedges, for the cylindrical section, depends upon the relative speed and frequency of longitudinal and circular movement of the charge. Best shape can be determined only by service tests.

Fig. 6—Looking along frontwall toward pour-out spout at end of a poorly designed 1300-ton cylindrical mixer. Dotted line shows original lines of jamb of pour-out spout. Spout location gives long sweep of metal and slag along frontwall



In the cone ends of submarine-type hot metal cars, keys are usually used instead of wedges, to decrease the size of individual steps in the corbels. In order to save time, however, some plants prefer wedges, laid with the aid of metal arch forms in the cone ends. In vertical, semi-closed type hot metal cars, the cylindrical body should be lined with keys. There is an increasing tendency, in mixers of all designs, to use thicker linings in areas of greatest wear, and to deviate from the shell lines and simplify the inner contour of the lining. This is done to facilitate bricklaying and eliminate trouble areas in the wear on the lining. If lining thickness is increased too much, however, the reduced temperature gradient through the lining increases the rate of slag corrosion. Thus, even though the trouble area is eliminated, extra brick used in the critical area may result in increased cost per ton of metal. All new linings should be thoroughly dried and slowly heated to red heat or above before iron is introduced.

Patching Practice—No attempt is made to patch the brick or stone linings of most hot metal cars—except beneath the spout—but a few are patched with brick in other zones of increased wear, when the campaign is about half finished. Attempts to patch these cars with plastic, granular, refractory material are sometimes made, but have not been generally successful. Some plants remove the car lining when a certain tonnage is attained—to prevent warpage of the shell. Monolithic linings—made of ganister and fireclay—used in the cars at a plant where the hot metal goes only to the pig machine, are patched regularly near the spout.

Critical areas in the linings of mixers are periodically maintained, in at least one plant, by a granular refractory material applied by a cement gun—thus prolonging the lining's service life. For this purpose, various types of acid and basic patching mixtures have been used—basic materials giving best results. Super duty fireclay plastic has been found fairly satisfactory for patching small eroded areas, in some mixers.

Service Testing—The most common, most expensive, and least dependable method of determining the best refractory for a given hot metal car or mixer, is the installation of complete linings of different types of brick on successive runs. This method wastes an enormous amount of time and money, and often leads to erroneous results, because it can give dependable results only when the campaigns being compared have practically identical service conditions (which rarely ever occur). Result of this method is usually a never-ending search for a better refractory.

Another common method is the testing of a large panel, in what is considered the most severe section. This method is much better, but is still not entirely dependable, because the zone of greatest wear is not always in the same location.

With acid refractories, the best method is to test several panels—each 4 or 5 feet square—in what is believed the most severe sections of each wall—then average the results. If a refractory is sufficiently superior, even a single brick will protrude sharply beyond the adjacent inferior brick, despite the extra

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faces exposed. By testing enough small panels of each of a judicious selection of different types of acid refractories, it is often possible to determine the best brick for the service conditions in one or two test campaigns.

Basic brick should not be tested adjacent to acid refractories, in the slag line area, because of possible reaction between the two types of brick, and because wear on the acid refractories could produce an acid slag which might damage the basic brick. Since acid refractories are commonly used in most cars and mixers, panels of basic brick would be in contact with acid refractories on all sides. They should, therefore, be tested as a band at least 6 to 8 feet high completely around the slag line, so that the basic brick are in contact with acid refractories only above and below the test panels.

Service Conditions In Cars — Service conditions which the linings of hot metal cars of all types must withstand are: Moderate thermal shock; chemical attack by slags high in iron oxide; and washing action of the metal during emptying, filling, and moving. The most important factors, which influence lining life are: Type and thickness of lining; amount and kind of insulation; size and shape of brick used; size and shape of the car; type of mortar; thickness of the joints and general quality of the bricklaying; composition and temperature of the metal; thoroughness of the skimming at the blast furnace; composition and quantity of desulphurizing agent added to the car; rate of travel; distance traveled; number of starts and stops; rate of change of speed; roughness of the tracks; number of pours; length of time the metal is in the ladle; length of time the ladle is empty; atmospheric conditions; frequency of reversing the car for both filling and emptying (turning the cars once a month improves lining life); height of the runner above the bottom of the car; and whether or not scrap is added to protect the lining from the force of falling metal.

Most important single factor of all those listed—assuming well-skimmed metal with no soda added—is temperature of the metal in the car, which usually falls within the range 2600-2750° F, when it enters the car. The metal temperature, when it leaves the car, depends upon numerous factors, the most important being: Temperature of the metal and lining when the metal enters; number of pours; length of time the metal remains in the car; weather conditions; amount of scrap added; and type and thickness of lining and insulation. Oxides of iron and manganese—chief corrosive agents in most car and mixer slags—combine with most refractories used in these cars—especially with those of the alumina-silica types—producing highly fluid compounds well below the lowest temperature found in any hot metal car.

Since the amount of iron oxide greatly exceeds that of manganese oxide, in most cases, it is probable that the prime reason for short lining life often observed with high manganese metal, is the fact that temperature of iron often increases with increase in manganese. Poor skimming of slag from the iron at the blast furnace may add substantial amounts of lime—another corrosive agent—to the slag normally formed in hot metal cars by oxidation of elements in the metal. When soda is added to the hot metal car itself, corrosiveness of the slag is greatly increased—rate of wear increasing with increase in amount of soda added per ton of iron, and with higher metal temperatures.

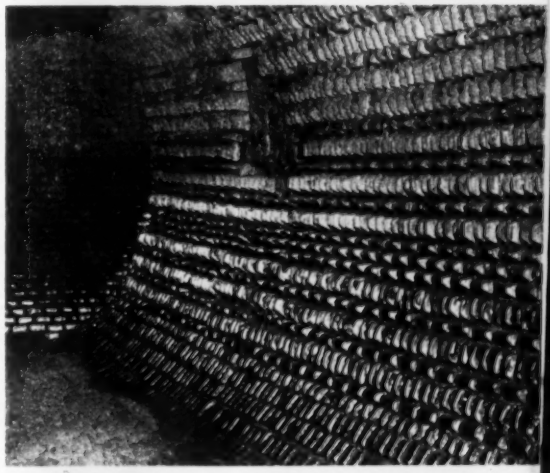
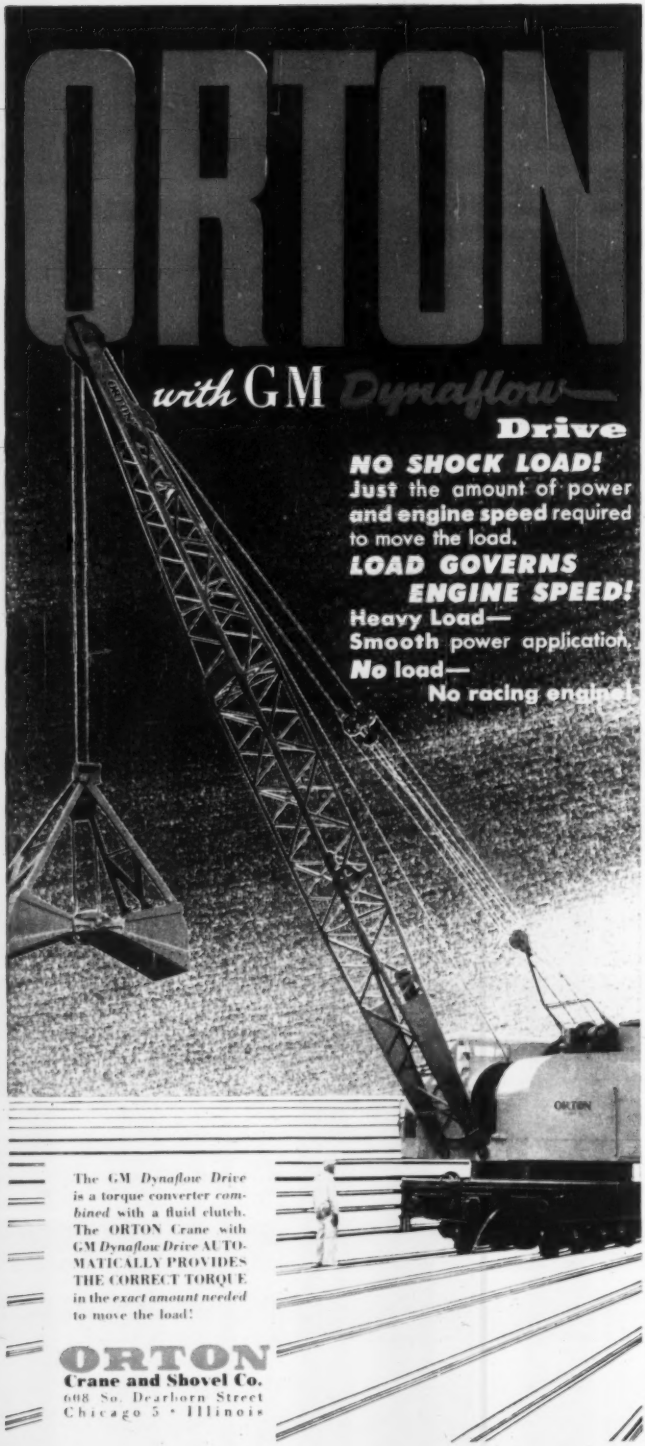


Fig. 7—Joint pencilling which is typical in a hot metal mixer in which fireclay brick is used with a mortar having less resistance than the brick to slag corrosion

Where Wear Is Greatest — Locations of greatest wear are usually around the openings where metal is poured in and out; in the area on the belly or sides immediately beneath the spout where the metal stream hits the surface of the unprotected refractories; around the slag line area; and on the cone ends. In some cases, the falling metal strikes too high on the car side, and does not hit the pool of metal until the ladle is one-half to three-quarters full. The result is that, even with frequent reversals of the car, the lining below the spout, where the metal hits it, is gutted out long before the rest of the lining is so badly worn. In such cases, as well as in normal operation, life of the lining may be materially increased by depositing runner scrap, ladle skulls, etc. in the empty ladle between casts. Submarine-type cars are sometimes provided with spouts having an opening larger than normal, to permit the melting of ingot butts—which are hard to recharge into the open hearth, unless they are cut into small pieces by means of oxygen torches. By acting as a baffle for the iron to strike first, the scrap reduces the force with which the metal hits the soft, yielding surface of the refractory lining—thus reducing the rate of wear. Method of handling the car—number and speed of starts and stops and roughness of tracks—governs the amount of splashing, and the rate and frequency of horizontal movement of slag and metal along the lining. All of these have a direct bearing on the length of service given by the lining—rate of wear being increased by increase in splash and movement of slag and metal. Such movement removes partially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neutralized slag from the lining and keeps the brick surface exposed to fresh, highly corrosive slag.

When the hot metal car is used only for transporting iron to the pig casting machine, the iron is usually in contact with the lining for so short a time that tonnage per lining is greatly increased. In one plant, where the cars are so operated, monolithic linings of ganister and fireclay, produce 200,000 to 300,000 tons per lining. This unusually high tonnage is obtained by virtue of patching each lining several times in the zone of greatest wear, near the spout, before it is removed. This is almost double the best life—125,000 to 180,000 tons—obtained from brick linings, in cars which are held at the open hearth until they are empty.

Thus, the new theory advanced above on mixers, viz., tonnage per lining often increases with increased tonnage per day—i.e., shorter time in the mixer—also applies to hot metal cars as well. Temperature of the lining, when the metal is introduced, determines the softness of the lining when the metal first hits it, thus affecting the rate of erosion. Addition of as much as 5 per cent scrap to the car between casts not only protects the lining from erosive force of the falling metal—it also cools the metal and slag. Although the amount of cooling is not great, it may be enough to prevent the temperature from exceeding the critical level, thereby decreasing the rate of slag corrosion on the lining. The practice of cooling the lining to 2000° F or below by air, steam, or water sprays between casts generally increases lining life, providing no spalling occurs.

Oil Quenching Case History

Solution to difficult quench oil purification problems at Salisbury Axle Works, division of Dana Corp., Fort Wayne, Ind., is discussed in new, specially prepared case history, published by and available from Honan-Crane Corp., Lebanon, Ind.

Entitled "Oil Quenching," it describes and illustrates Salisbury's three 1500-gallon oil quenching systems for heat-treating of automotive gears. It reveals how purifiers reduce and maintain sediment content of quenching oil well below maximum tolerance of 0.04 per cent, keep piping systems clean, free of contamination such as scale and other foreign matter which collect in tanks, pumps, feed lines and cooler tubes and eliminate down time and cleaning problems since contaminants are removed from oil during the quenching process.

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TYPE SR—Wound Rotor Splash proof. Same electrical characteristics as motor shown above. In addition, gives adequate protection against falling and splashing liquids.

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TYPE RS—Splash proof. Same advantages as open construction, plus protection against splashing and falling liquids.

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Quality Control

(Concluded from Page 74)

Lundberg even that initial expense was modest. The developing and setting up of the program, as far as the company has gone, has cost nothing over and above regular inspection expenses except for the printing of special record and chart forms. Today Lundberg uses five inspectors to cover the multiple shift operations where it uses the system. "We would require at least the same number of men to cover those groups using the old floor or group type of inspection," says Mr. Muir. The entire program is administered by Mr. Muir and one working group leader.

Most people experienced in statistical quality control have this advice to any company wishing to start from scratch: Get a good man to run your program; be prepared to wait two years or more before you get concrete results; start small with just part of your operations; be prepared to adapt the basic statistical controls to your plant—some controls won't work well the first time.

Furnaces for Defense Work

Prompted by the growing evidence that demand for new industrial furnaces needed for heat treatment of aluminum and steel defense items is moving beyond the capacity of the producers of such equipment, the Government Business Committee of the Porcelain Enamel Institute has compiled a comprehensive report of defense work possibilities for porcelain enameling furnaces.

According to E. W. Dany, chairman of the subcommittee making the survey, the project was undertaken to assist institute members in converting their porcelain enameling furnaces to defense work and to suggest specific defense applications. An inventory of available furnaces also was made.

It was found there are approximately 350 batch-type and 250 continuous monorail-type enameling furnaces in the United States. All enameling plants also have pickling facilities—a fact the committee considers to be of equal importance to the furnace in some heat treating operations, i. e. removal of scale to prolong die life.

According to the committee, batch-type furnaces could be used for annealing and hardening various steel products with a minimum of furnace changes. The report outlines proper conversion procedure as well as additional changes needed for heat treatment of aluminum. Several specific conversion and heat treatment projects accomplished during World War

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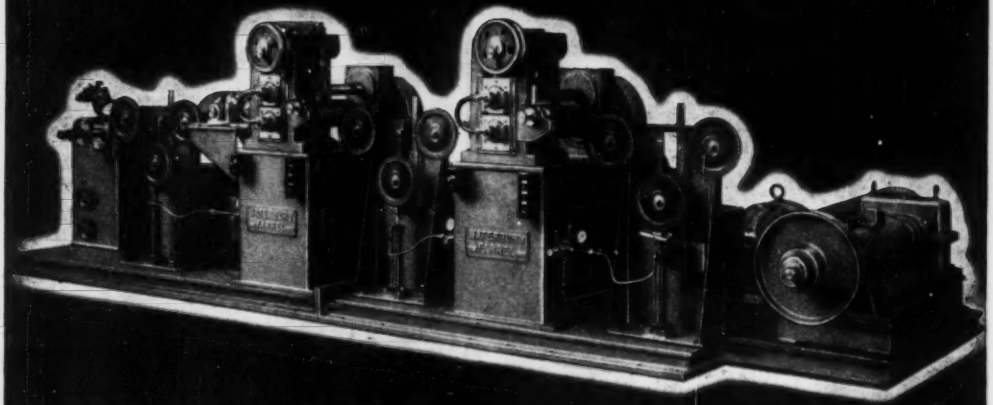

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II are described, involving such items as armor plate, tank treads and shovel blades.

The report also outlines conversion procedure for continuous monorail-enameling furnaces and describes actual use of these furnaces for heat treatment of 14-foot lengths of armor plate, bombs, and steel cartridge cases. It is pointed out that most porcelain enamel plants have press equipment which could be utilized in the stamping of steel cartridge cases, and that in many other cases individual plant factilities will enable production operations in conjunction with heat treating.

The committee estimates that utilizing only half the furnaces in the porcelain enamel industry for heat treating would result in a daily output of approximately 36 million pounds.

New Roller Bearing Standards

A new 20-page American standard on tolerances for ball and roller bearings is announced by the American Standards Association, New York. It is the second of a series of antifriction bearing standards under development by a committee representing 14 trade associations, technical societies, and the U.S. Army and Navy. This standard establishes tolerances and limits of size governing dimensional interchangeability of various types of bearings. Compliance with these tolerances should be checked in accordance with the American standard gaging practices for ball and roller bearings, B3.4-1950.

The standard contains 15 tables specifying tolerances on the bore, outside diameter, width, and other characteristics of a bearing in different grades of accuracy required for various bearing applications. Types of bearings covered are: Annular ball; cylindrical roller (including journal); magneto; airframe; thrust ball; industrial and airframe needle; and tapered roller bearings.

Specifications are given also for the maximum permissible variation in diameter between the largest and smallest ball or roller in any assembled bearing; for the hardness of balls, and rollers; and for snap ring and groove dimensions.

Kit for Carbide Conservation

To help carbide tool users extend the production life of critical carbide tipped cutting tools, Industrial Products Division of Elgin National Watch Co., Elgin, Ill., announces the availability of a special carbide conservation kit, for lapping carbide tools.

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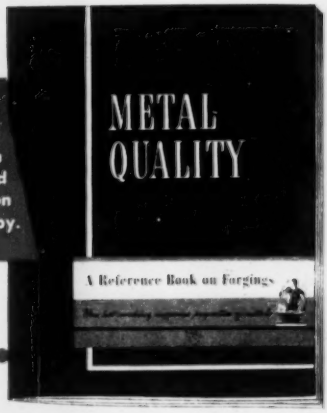

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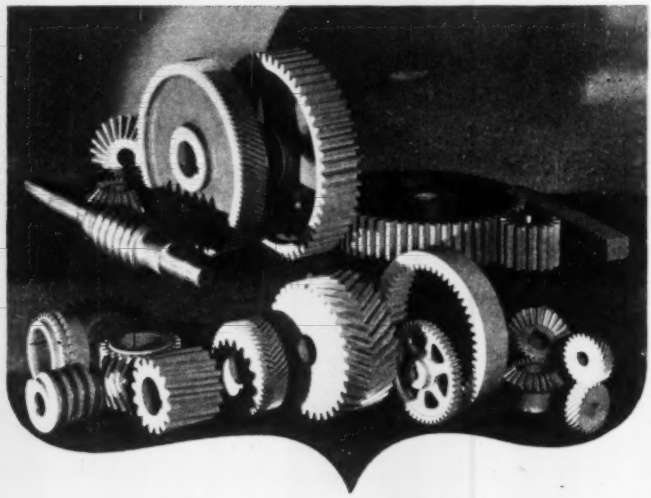

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diameter formica lapping wheel, a Dymo applicator gun specially modified to facilitate charging of the wheel and 5 grams of Elgin's Dymo diamond compound, sufficient for lapping approximately 500 average, single point carbide tipped tools. Further information and prices are available from the company.

Mill Changed Over in 66 Hours

Westinghouse Electric Corp. completed installation of main drive and auxiliary equipment in 66 hours at the Weirton Steel Co., subsidiary of the National Steel Corp., in Weirton, W. Va. Mill operating speed was increased from 1500 fpm to 3100 fpm by the use of larger horsepower motors. The new motors and auxiliaries were installed while the mill continued in operation and the changeover was made during a shutdown for revamping the mechanical equipment. Weirton's No. 5 tandem mill handles coils up to 36 inches wide and rolls a wide range of strip thicknesses, finishing 0.007 to 0.050-inch from 0.080 to 0.095-inch hot rolled bands.

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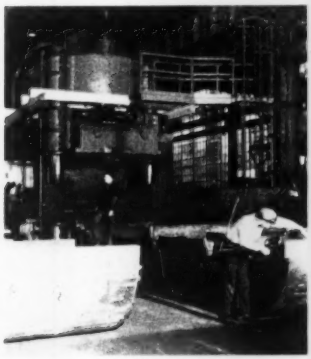
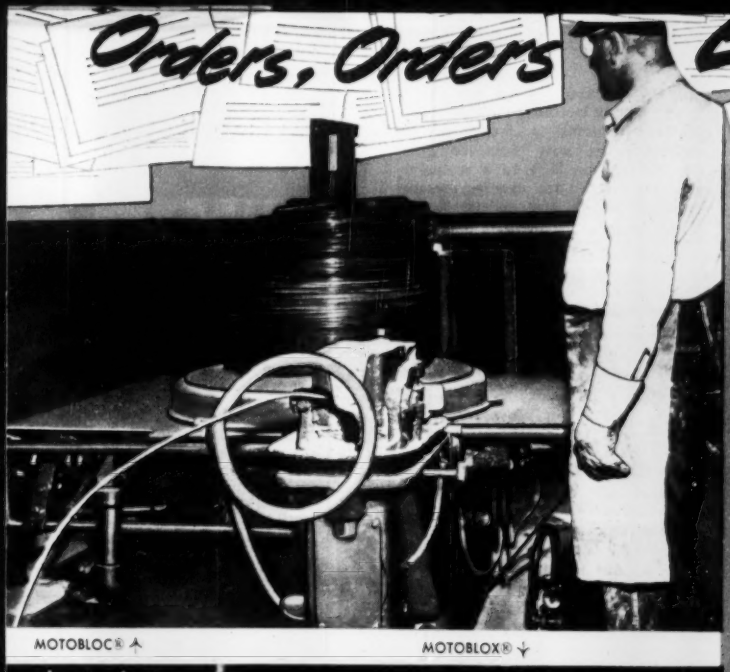
Vessels Handle 70,000 psi

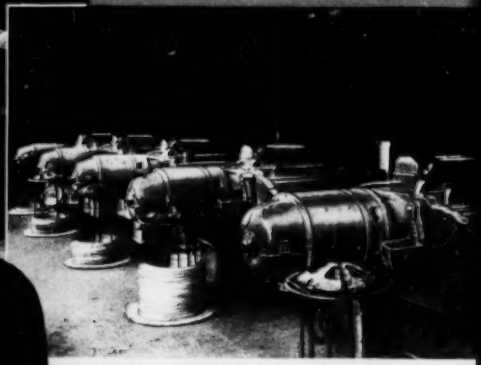


FABRICATING plate up to 5½ inches thick into pressure vessels, condensers and related equipment is a big job at Foster-Wheeler Corp., Cartaret, N.J. Finished products must withstand pressures up to 70,000 psi. Flat sections are heated in a nearby furnace and then formed in the press shown above. Workman at the right is setting up a flame-cutting tractor used to bevel sections for subsequent welding by GE submerged-arc machines

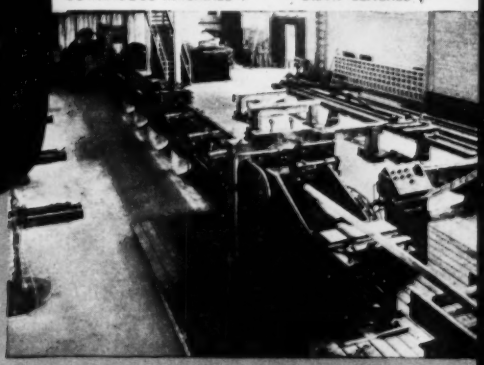


MOTOBLOC® MOTOBLOX®

You can Deliver with Vaughn



CONTINUOUS MACHINES DRAW BENCHES



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COLD DRAWING MACHINERY

The best help you can have in meeting today's great demands for cold drawn products comes through the fast, flexible performance of today's VAUGHN Equipment! *Let us detail the facts, in relation to your present production problems.*

The VAUGHN MACHINERY CO., Cuyahoga Falls, Ohio, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

SCRAP MEANS

DOLLARS

AND MORE STEEL

● You'll be amazed at how many hundred pounds of high-dollar scrap iron and steel your plant is harboring . . . old and obsolete dies, tools and machinery, broken parts, unreturned scrap clippings and blankings, and just plain junk.

Prices for scrap are high today . . . call your scrap dealer . . . make old machinery help pay for new, efficient machines.

Shortages of steel can be eased if you get this scrap on its way through dealers to steel mills . . . every ton of scrap helps make 2 tons of new steel.

Tell your plant foremen to start gathering scrap today . . . survey your machinery inventories for old, useless "clunkers."

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION

General Offices • Cleveland 1, Ohio

hp, 180-720 rpm double armature. Power supply is from individual generators including a 5-unit motor generator set with separate generators for stands 1 to 3 inclusive and the reel. An existing motor generator set is used on the fourth stand. Rototrol controllers are used for speed of response to prevent overshoot.

Aircraft Designers' Catalog

Publication of a new aircraft designers' catalog of Speed Nut fasteners is announced by Tinnerman Products Inc., Cleveland. Devoted exclusively to fasteners for military and civilian aircraft, the new aircraft parts catalog No. 500 lists all the aircraft fasteners manufactured under Mil-N-3337 specifications, which govern sheet spring nuts for all branches of the military government.

The new catalog gives detailed specifications for fasteners, as well as their possible applications, and also shows how the fasteners are developed, engineered and manufactured for specific jobs.

It was also revealed that Tinnerman has resumed production of the same fasteners it made during World War II for the attachment of component parts to airplanes. The company also is developing a wide variety of new types, both for military airplanes and for many other types of military equipment.

New Finishes for Zinc

United Chromium, New York, has added two new compounds to their line of Unichrome dip compounds for decorative and protective finishing of zinc. The additions, identified as Nos. 1060 and 1070, are used to produce corrosion-resisting, chromate-type conversion coatings black or olive drab in color. The finishes are produced on a metal-conserving deposit of 0.0002 to 0.0005-inch of zinc. The process is a simple dipping one which can be carried out at room temperature.

Forging Practice Explained

A series of illustrated technical articles on the uses of the modern forging machine, together with the latest developments in hot upset forging practices are being made available by the Hill Acme Co., Cleveland, manufacturers of forging machines. Four of these articles have already been sent out at monthly intervals, and additional numbers are being written by well-known authorities on the subject. The ultimate purpose is a compendium of modern forging practices which can be used as a textbook for the industry.

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TO GET YOUR NEW PRODUCTION GOING AND KEEP IT GOING

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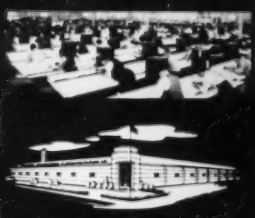

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ENGINEERS, DESIGNERS, CONSULTANTS AND PRODUCTION SPECIALISTS

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INQUIRIES PROMPTLY ANSWERED

ELECTRUNITE TUBING *Eases Life-*

FOR THE MANUFACTURER...

FOR THE PATIENT...

HOSPITAL PATIENTS can relax in every position, from full-reclining to upright, in this sturdy rejuvenating chair made by Barcalo Manufacturing Company. Steel tubing provides the stiffness and rigidity to make the chair steady and reassuring to the patient, yet light to move.

The manufacturer likes the way ELECTRUNITE Steel Tubing works on this application. Uniform ductility and wall thickness assure rapid, predictable forming and bending of the tubes to shape. Where tube ends must be fully flattened at joints, there's no trouble with cracks and fractures. The excellent surface of this ELECTRUNITE Tubing requires no special handling or trick treatments to hold long-lasting finishes under severe service.

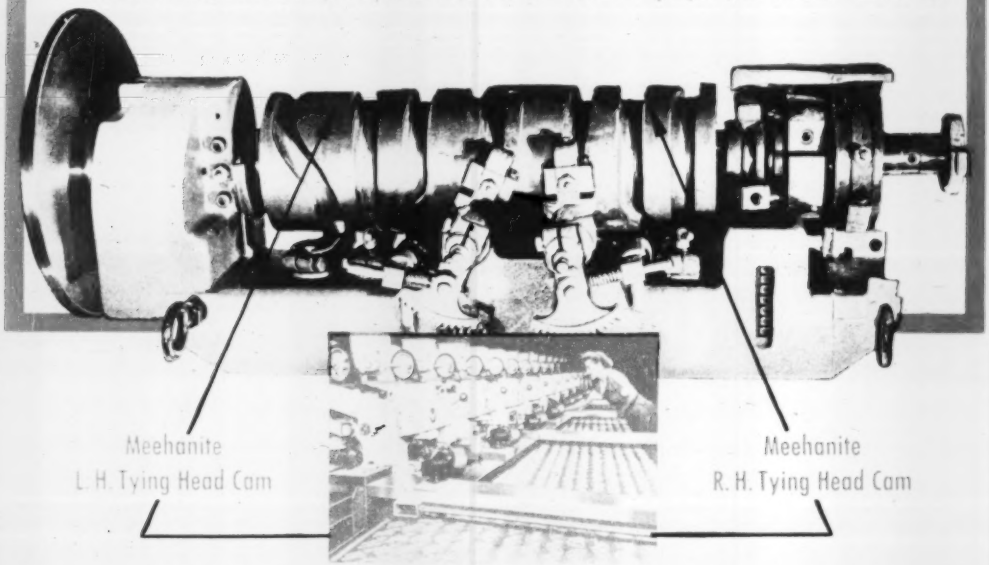
Have you considered using ELECTRUNITE Steel Tubing in your essential products, such as these invalid chairs? We'll be glad to discuss your problems . . . and offer you the benefits of Republic's 3-Dimension Metallurgical Service. It's the helpful service that focuses the knowledge and experience of field, mill, and laboratory metallurgists on your fabrication problems.

REPUBLIC STEEL CORPORATION
STEEL & TUBES DIVISION
224 EAST 131st STREET
CLEVELAND 8, OHIO

Republic REPUBLIC STEEL
ELECTRUNITE TUBING

The Wear Resistance of MEEHANITE Metal offers

PROLONGED ACCURACY and SERVICE LIFE



The accuracy of the mechanism of a machine reproducing the tying motions of human hands and fingers in the manufacture of pretzels is dependent in many ways upon the Meehanite cam illustrated. Manufactured by the American Machine & Foundry Company, New York, N. Y., the machine contains many unique design features built around the dependability and steady accurate performance of many parts governed by the Meehanite cam. The cam is built up from two Meehanite castings into which seven individual cam tracks are machined.

Freedom from after-machining distortion, plus the wear resistance and machinability of the Meehanite castings are important contributions to the equipment.

The better properties of Meehanite castings are achieved through established and scientific production controls and these extras in characteristics and quality can help improve your product and manufacturing efficiency.

WHEN YOU NEED "EXTRAS" IN QUALITY OR PROPERTIES CONSULT ANY OF THE FOUNDRIES LISTED BELOW

MEEHANITE

"This advertisement sponsored by foundries listed above."

NEW ROCHELLE, N. Y.

Hydraulic Presses Form Homogeneous Wheels

UNIFORMITY of internal structures and close dimensional tolerances of Simonds grinding wheels are attributed largely to the close pressure control of the hydraulic presses utilized to form the "green" wheels. A number of hydraulic presses, ranging in capacity from 130 tons to 3000 tons, are being used in the Philadelphia plant of Simonds Abrasive Co. in the manufacture of grinding wheels. These wheels range in size up to 48 inches in diameter and 6 inches in thickness.

The presses are used in making both resinoids and vitrified bonded wheels, the two principal types of

grinding wheels in common industrial use, from a mix consisting of particles of abrasives and bonding materials.

In both these presses, operating levers control the speed of ram movement in either direction and the rate of load application. Excessive loads are prevented and compression loads closely regulated during press operation by means of controls on the pressure valve and a pressure gage in view of the operator. There can be no impact loads. On the 3000-pound Baldwin press, the controls and gage are on the side of the press at right angles to the direction of feed through the press. Tables specially designed for the preparation of molds and their removal after the mix is compacted are located on the feed and delivery sides. During the compacting process pressure is held below maximum for a brief period before the total compacting pressure is applied.

For the production of a large grinding wheel the mix is weighed in four scoops and poured into a hopper from which it is distributed into a motor-rotated steel mold on the feeding table. This mold consists of a round steel plate with a hole in its center and closely fitting center ring and circumferential ring. Uniform

The HEVI DUTY Tool Room Combination

Hevi Duty Tool Room Combination installed in the plant of a large pump manufacturer.

for Precision Heat Treating of Tools and Dies

This Hevi Duty combination is a complete, low cost heat treating unit for tool rooms and small manufacturers. The "Temperite," air draw tempering furnace, "Treet-All," multipurpose furnace, and "Alloy 10," high temperature furnace, provide temperatures from 250° F to 2350° F. Prepared atmospheres are supplied by the "Atmo-Gen." Furnaces and the "Atmo-Gen" are available separately.

Send for bulletin HD 1147

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI-DUTY ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

MILWAUKEE 1, WISCONSIN

OVER ONE HUNDRED YEARS OF CONTINUOUS SERVICE. ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS

BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS.

Making
BEST USE OF
AVAILABLE
STEEL

In times of emergency, substitutes can often be used to good advantage.

Right now, the urgent requirements of production for national defense are taking the lion's share of high-grade alloying materials.

That is as it should be, of course. But the fact remains that many manufacturers are being confronted daily with knotty problems of production.

Frequently these difficulties can be solved by using substitute grades or alternate methods of manufacture and treatment.

To help you decide *which* substitute grades you can use and *how* you can use them most effectively, call on our staff of metallurgical experts.

A letter – or a phone call – will focus Wheelock, Lovejoy's specialized technical skill and long experience on your individual problems.

And we'll be delighted to be of service.

Write today for your FREE COPY of the Wheelock, Lovejoy Data Book, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

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HY-TEN and AISI

thickness of the mix is produced by the edge of a smoothing plate. A closely fitting reinforced steel cover plate is laid on the mix to complete the mold. The mold is then pulled into the press by means of a small overhead crane and wire cable working over a stationary sheave.

After the mix has been compacted into a wheel of the desired density, the mold is pulled on through to the opposite side of the press where wheel and mold are separated by a smaller hydraulic press. The "green" wheel is then carried by overhead crane to a skid which is stacked with others for transfer by lift truck to a temporary storage area for drying. A crew of four men handles production of large size abrasive wheels.

In general, Simonds grinding wheels consist of two principal types of abrasives: Fused crystalline aluminum oxide (Borolon), which is the most widely used, and silicon carbide (Electrolon). Various types and a wide range of grain sizes are used to meet every requirement. In addition to the vitrified bonding agents there are resinoid materials of the phenol formaldehyde type, silicates and shellac. Probably 90 per cent or more of all wheels are made with vitrified and resinoid bonding agents.

In vitrified bonded wheels the abrasive cutting particles are held in position by blended clays and other ceramic materials fused or vitrified at high temperature. Both periodic and continuous type kilns are used in the firing process with accurate and automatic temperature control.

Blades Broached 60 per Hour

For accelerated production of turbo-supercharger wheels and mating blades, Lapointe Machine Tool Co., Hudson, Mass., has developed a broaching procedure based on its single ram vertical broaching machine. Company handles both jobs on a 15-ton, 90-inch stroke machine through the use of interchangeable fixtures.

The wheel fixture embodies completely automatic indexing and hydraulic clamping. The blades are broached two at a time—the first blade being rough broached, and the second one finished broached, at the same stroke of the machine. Conventional tools are used. Fixtures for both the wheel and the blades are mounted on in-and-out tables. The wheel is a conventional forging. The blades are broached from bar stock, Timken alloy 16-25-6.

Based on 80 per cent efficiency, the time required for broaching the complete wheel, with 32 pine-tree

Check the advantages of melting and remelting quality steel with TOCCO Induction Heating

Several TOCCO melting furnaces may be operated from one TOCCO high-frequency power source.

- ✓ Extremely Rapid Melting
- ✓ High Efficiency on Intermittent Operation
- ✓ Good Mixing because of Natural Agitation
- ✓ Extremely Low Alloy Loss
- ✓ High Reproducibility of Results
- ✓ No Carbon Pick-up
- ✓ No Contamination when Composition of Charges is Changed
- ✓ Minimum Space Requirements
- ✓ No Special Installation Charge
- ✓ Simple, Safe Operation
- ✓ Clean, Comfortable Working Conditions

If any of these advantages suggest economies in your operations write us for full details—no obligation, of course.

Some Users of TOCCO High-Frequency Melting Furnaces

American Electro Metal Corp.
Haynes Stellite Company
E. I. Dupont de Nemours & Co.
Union Carbide and Carbon Corporation
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Watertown Arsenal
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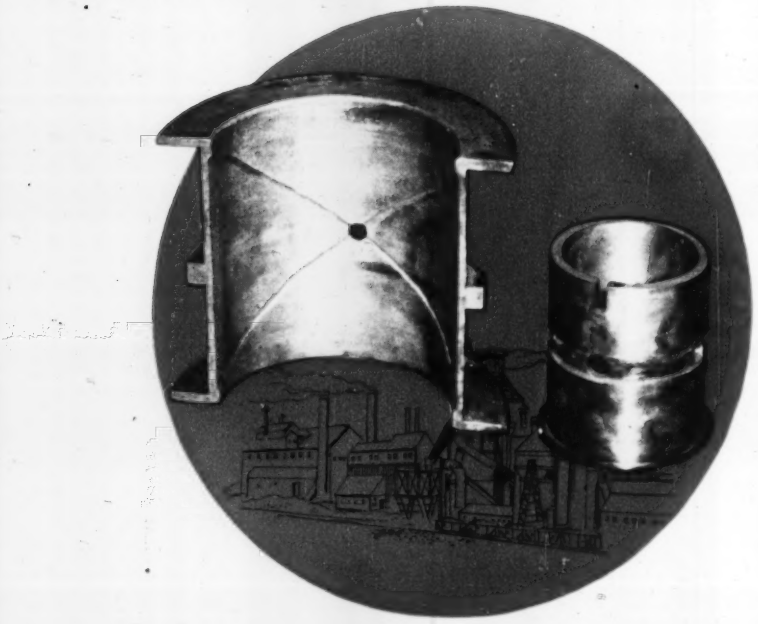
Arwood Precision Casting Co.
Various Atomic Energy Plants and Laboratories

THE OHIO CRANKSHAFT COMPANY
CLEVELAND 1, OHIO

TOCCO

Hardening • Brazing
Annealing • Soldering
Forging • Melting



PRODUCED: BEARINGS THAT LAST 3 TIMES LONGER

An example showing how National Bearing Division has helped lick costly maintenance problems

AIR that's laden with dust and scale can be rough on bearings—as a large Midwest steel plant found out with an average of just 2 months' service on bearings in charging car wheels and edgers. Replacement labor and expense were going way out of line, when National Bearing Division stepped into the picture.

Our engineers made a special study of this mill's problem. As a result of this study they recommended a hydraulic bronze, both for its superior anti-frictional qualities and its high abrasion-resistance. Special methods of alloying and pouring, developed through N-B-M metallurgical research, insured sounder and denser castings of this bronze—further increasing its resistance to wear and abrasion.

Result? These bearings last 3 times as long as the bronze formerly used! Replacement labor and expense took a nosedive.

This actual example of how National Bearing Division saved money for a customer proves two important points: *first*, that N-B-M has the facilities for thorough research on proper alloying, and *second*, that we have the engineering skill to apply the fruits of this research to our customer's problems on . .

Non-Ferrous Bearings and Castings—
As-Cast or Machined

Bronze Bars—
As-Cast or Machined; Cored, Solid, Hexagon

Babbitt Metals—
For every type of bearing service

AMERICAN Brake Shoe COMPANY

NATIONAL BEARING DIVISION
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WHY? Because everybody wants the *best* equipment!

The man who *works at it* wants a HALLOWELL Bench because he likes its *convenience*, its *smooth, durable work surface*, and its *rock-solid "stance"*.

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Whether you *use* or *buy* work benches, you'll want our Bulletin 701. It gives complete details. Write for your copy today.

Work Benches	Posture Stools
Foreman's Desks	Posture Chairs
Tool Stands	Cabinets
Platform Trucks	Folding Tables

-SPS-

STANDARD PRESSED STEEL CO.

JENKINTOWN 33, PENNSYLVANIA

slots, is 65 minutes. The blades are broached at a speed of 60 finished blades per hour. Very close tolerances are maintained — within 0.0005 to 0.0007-inch. Closer accuracy than this can be obtained, it is claimed, even with the production speed indicated above.

Measures Enamel Adherence

A new instrument for accurate measurement of porcelain enamel's adherence to metal now is available for use by the industry's laboratories, according to the Porcelain Enamel Institute. The result of more than four years of research, the adherence meter evaluates adherence of porcelain enamel to steel by electrical contact, thereby eliminating the variable human factor involved in previous adherence testing methods.

The degree of adherence has long been considered an important criterion of the quality of porcelain enamel ground coats, but industry previously has relied, for testing, on a visual estimate of the amount of bare metal exposed within a given area on a porcelain enameled specimen after it had been deformed in a specified manner. Since porcelain enamel normally is an electrical insulator, the basic principle of the adherence meter depends upon the completion of an electric circuit through the metal of the deformed specimen to a steel probe touching the test area. By using a large number of probes, and counting the number that conduct a current during testing, an accurate determination in terms of numerical units can be made of the area that has been exposed.

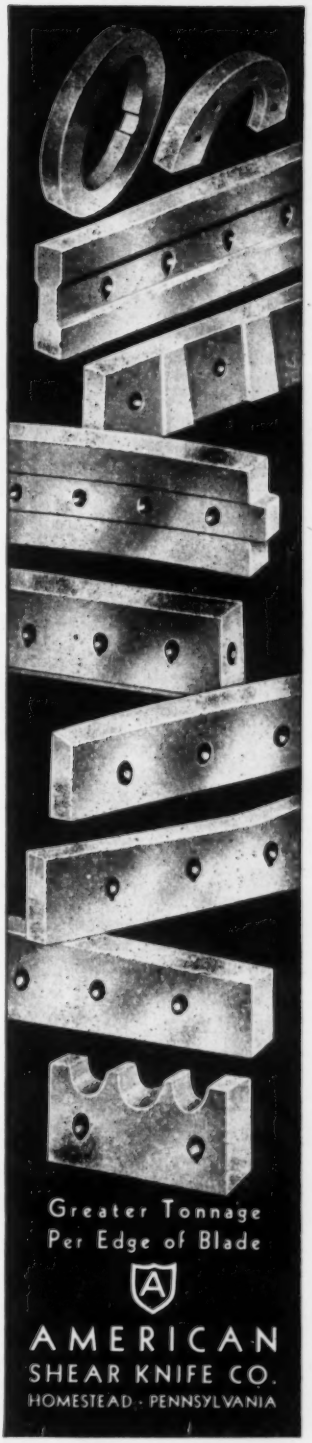
Adaptable to metals from 13 to 24 gage thick, it can be used on many production parts as well as laboratory samples. Ordering information may be obtained from the Porcelain Enamel Institute, 1010 Vermont Ave. N. W., Washington 5, D. C.

Fitting Standard Revised

A revised edition of the American standard for steel butt-welding fittings was recently approved by the American Standards Association, 70 E. 45th St., New York 17, N. Y.

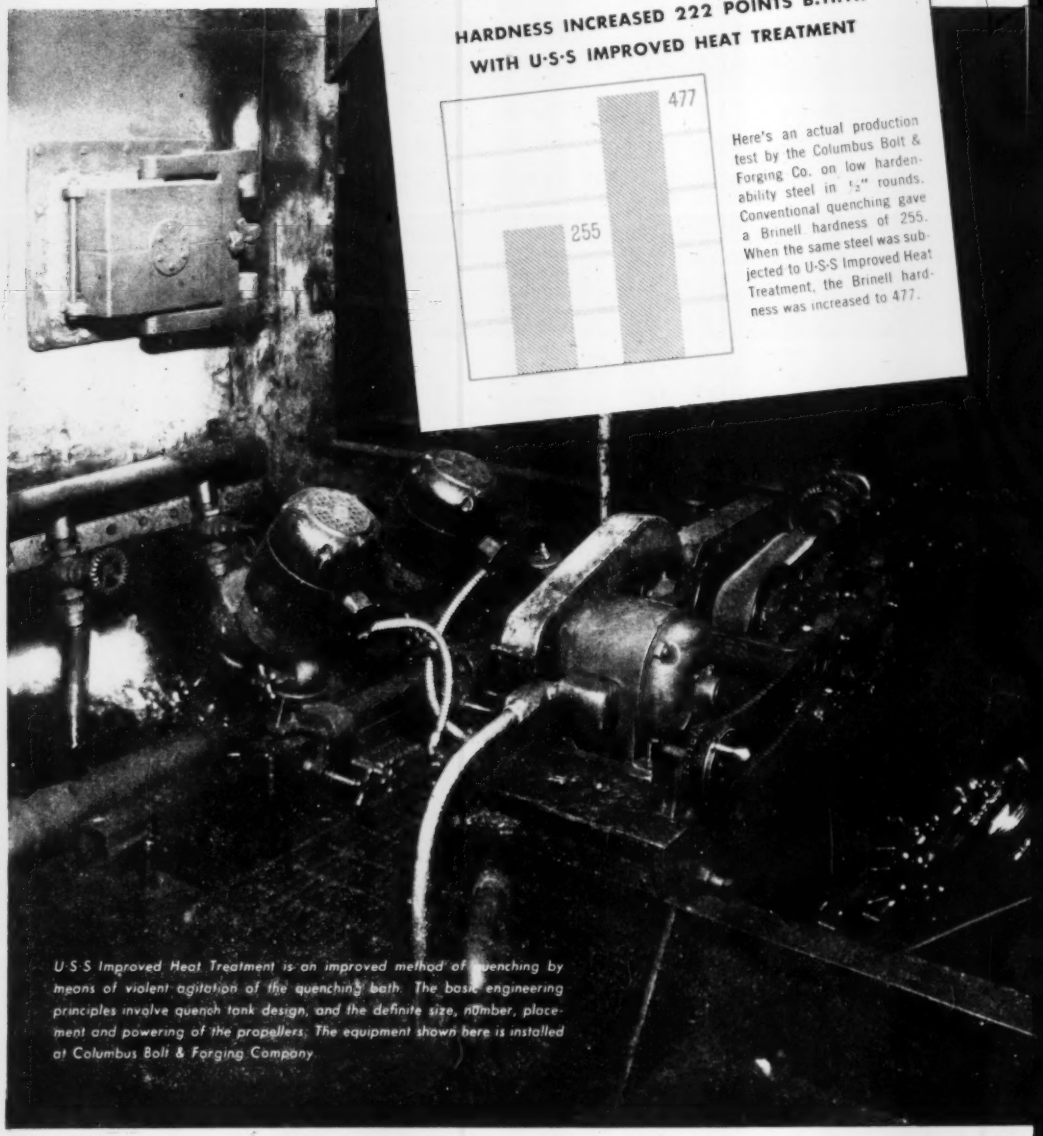
These fittings are for pipe lines for which mechanical joints are not solid enough and which need more permanent fittings, such as pipelines carrying very high temperatures; pressure steam lines; cross-country lines; and all oil refinery pipe lines.

In the new edition all series of fittings are given in sizes from 12 to 24 inches inclusive. The standard contains tables for tolerances; long radius elbows; 180-degree returns;



HOW TO GET THE MOST OUT OF

—keep a sharp eye


HARDNESS INCREASED 222 POINTS B.H.N.
WITH U·S·S IMPROVED HEAT TREATMENT
477
255
Here's an actual production test by the Columbus Bolt & Forging Co. on low hardenability steel in 1/2" rounds. Conventional quenching gave a Brinell hardness of 255. When the same steel was subjected to U-S-S Improved Heat Treatment, the Brinell hardness was increased to 477.

U·S·S Improved Heat Treatment is an improved method of quenching by means of violent agitation of the quenching bath. The basic engineering principles involve quench tank design, and the definite size, number, placement and powering of the propellers. The equipment shown here is installed at Columbus Bolt & Forging Company

THE ALLOY STEEL YOU'RE GETTING

on quenching methods

TODAY, as critical alloying elements become scarce, all users of alloy steel are faced with the necessity of getting the most out of the steel they're receiving.

In most cases, this puts the problem squarely up to the heat-treater. Better heat-treatment methods can often do the job.

If you encounter difficulties, don't be too quick to blame the steel or the heating practice. The answer may be better *quenching* methods. More specifically, your problem might be solved with U·S·S Improved Heat Treatment — a superior quenching technique developed by United States Steel.

U·S·S Improved Heat Treatment extracts heat rapidly and *evenly* from every part of the material's surface. This treatment assures accurate timing, allowing removal of the material from the quenching bath while a certain amount of residual heat is present. Elapsed time from quench to tempering treatment is held to an absolute minimum. This not only improves mechanical properties; it also reduces cracking. And, this quenching method improves machinability by minimizing the formation of free ferrite in hypo-eutectoid steels.

The use of this quenching process is available to you without charge.

United States Steel does not manufacture or sell heat-treating equipment, but our metallurgists will be glad to analyze your heat-treating methods and make suggestions that may give you more uniform hardness, less rejects and less retreatment.

UNITED STATES STEEL COMPANY, PITTSBURGH
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY
WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Comments on U·S·S Improved Heat Treatment

by Mr. R. E. Christin, Chief Metallurgist
Columbus Bolt & Forging Co., Columbus, Ohio

"Quenching is a process often neglected in heat treatment. We feel it is just as important (if not *more* important) than any other phase of heat treatment. There is a tendency to concentrate too much on the heating—and lay too much blame for failure to the heating—when proper quenching could produce the objectives desired. Heating, even in the ideal environment, can be inadequate if quenching is faulty.

"Before we installed U·S·S Improved Heat Treatment, we occasionally encountered hardness variations in the as-quenched condition. These variations were loosely attributed to either the steel, or the heating or the quenching. However, after adopting the U·S·S agitated quench process, these hardness variations were practically eliminated, obviously indicating that conventional quenching was the chief cause of the hardness variations.

"After seven years' experience with U·S·S Improved Heat Treatment, we are convinced that this method is the answer to most hardening problems."

Carilloy Steels

ELECTRIC FURNACE OR OPEN HEARTH

COMPLETE PRODUCTION FACILITIES IN CHICAGO OR PITTSBURGH

1-933

UNITED STATES STEEL

Maximum Production in Limited Floor Space with FOSTORIA INFRA-RED

for

FINISH BAKING
DRYING
DEGREASING
SOLDERING
PREHEATING
DEHYDRATING
ETC.

Read these Results Typical of Thousands of Fostoria Infra-Red Installations

"When you have limited floor space and want to get out maximum production, this is the only efficient way to do it," says H. O. Buschman, Plant Engineer at Perfection Stove Co., Cleveland. The Fostoria oven requires only half the floor space previously needed for a fuel fired oven.

SAVES SPACE

Fostoria Infra-red ovens operate on a comparatively short cycle which results in smaller oven requirements. They may also be suspended from ceiling mounts to eliminate floor space entirely.

SAVES TIME

Reduces processing time from hours to minutes because of the inherent speed of Infra-red. There is no time lag in starting an oven, the heat is instantaneous.

SAVES MANPOWER—MANHOURS

Ideal for conveyorized production methods. Reduces excessive product handling. Turns out more pieces per day with ease, with less people.

CUTS COSTS

Faster production, lower operating costs, improved quality, result in lowest "per piece" cost.

A variety of furnace panels, bases, etc. are now finish baked in 6 minutes at the rate of 80 pieces per hour. The flexibility of the Fostoria oven permits switch control of each bank for full or half voltage to vary heat intensity according to production requirements. All handling is eliminated except at inspection and transfer points.

Throughout industry, new high standards of production efficiency are being set by utilization of the Fostoria Infra-red System. Savings in "per piece" production cost are substantial with many additional advantages on both large and small operations. Whatever your baking, drying, degreasing, or industrial heating problems may be, investigate the high efficiency of Infra-red ovens as engineered by Fostoria. Case histories of installations applicable to your production are available on request.

GET THE FACTS ON FOSTORIA "KNOW HOW" HELP TO REDUCE YOUR "PER PIECE" PRODUCTION COST

Write, today, for this factual information on this Infra-red process and equipment as engineered by Fostoria. Technical data applicable to your operations will be included if you send us general facts about your particular problem. A Fostoria representative will gladly analyze your production needs and submit definite recommendations and carefully forecasted results for your consideration.

THE FOSTORIA PRESSED STEEL CORPORATION
FOSTORIA, OHIO

Oldest and Largest Manufacturers of Industrial Infra-red Ovens

INFRA-RED fostoria SYSTEM

straight tees; reducing outlet tees; lap-joint stub ends; caps; and reducers. For the first time, heavy wall caps are listed. A complete series of 78 reducing outlet tees, from 1 to 24 inches, has also been added.

Broaching Cycle Is Automatic

Duplicate sets of manually operated fixtures and associate tools installed on an Oilgear double slide vertical surface broaching machine are used to finish broach four surfaces on forged steel steering knuckle spindles at the rate of 410 parts per hour at 85 per cent efficiency. Approximately 0.040-inch stock is removed from each surface. As one shuttle table moves outward to loading position, the other table moves inward and is preloaded in broaching position to resist peak tonnage tool face thrust.

One fixture is loaded while spindle in other fixture is being broached. With automatic cycle, operator merely raises lever on fixture to release and move clamping arm to the right and also disengage both locating pins from king pin holes. Broached part is removed and new part inserted in place. Lever on fixture is depressed to insert locating pins in king pin holes, move clamping arm to the left and clamp spindle in place. Maximum cutting speed is 30 feet per minute.

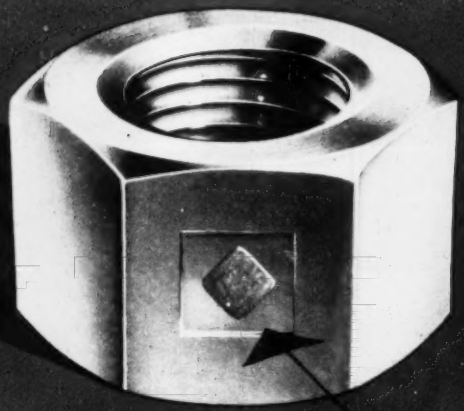
Solves Heat Transfer Problems

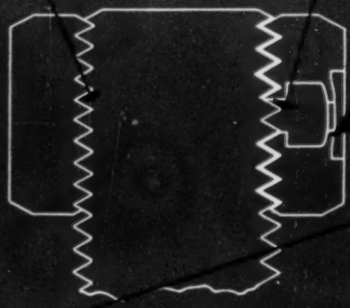
Laboratory data on the use of Platecoils as a medium of heat exchange is available in a new technical manual published by the Platecoil Division of the Kold-Hold Mfg. Co. These data are based in part on the results of an extensive research program conducted by Battelle Memorial Institute, Columbus, O., involving all styles and representative sizes of Platecoils.

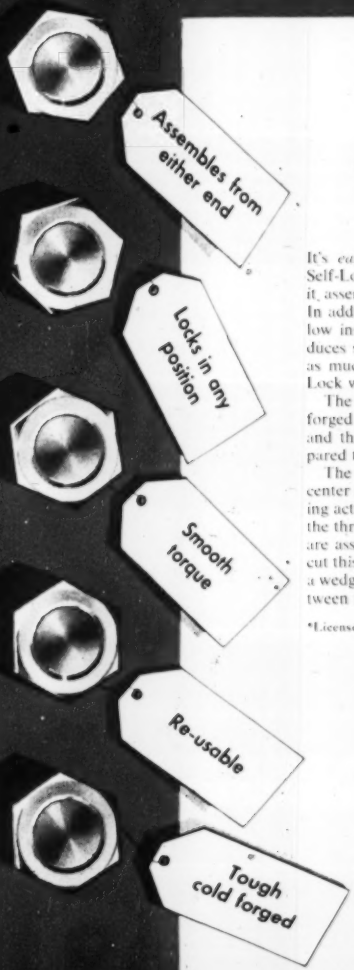
The technical manual provides the engineer with the principal data required in the solution of heat transfer problems. It simplifies the process of selecting and applying industrial heat transfer equipment by supplying charts and formulas to aid in the basic calculations of industrial heating and cooling applications.

Management Proceedings Ready

Proceedings of the 14th annual time and motion study and management clinic sponsored by the Industrial Management Society are available. The volume consists of 112 pages including charts, forms and illustrations. It also contains complete transcripts of talks by top leaders of labor, management and government time study motion economy, methods, plant layout, materials







Easy Does It With
Townsend Nylok Locknuts

It's *easy* to install the new Townsend Nylok Self-Locking Nut* as it has no top or bottom—it assembles readily even in blind applications. In addition, you get positive locking action with low installation torque. This saves time and reduces scrap losses due to seizing and galling by as much as 80% over other types of locknuts. Lock washers and jam nuts are eliminated.

The Townsend Nylok Type "E" Nut is cold forged to provide added strength in the body and threads and to save critical material compared to nuts machined from bar stock.

The small nylon plug insert located in the center of one of the hex faces provides the locking action. This plug extends beyond the crest of the threads in the nut and when the nut and bolt are assembled the bolt compresses but does not cut this nylon plug. The nylon plug then reacts as a wedge creating strong metal to metal action between the male and female threads.

*Licensed under The Nylok Corporation patents.

Nylok nuts lock in any position. Seating is unnecessary. Due to nylon's ability to retain its original shape, these nuts can be used again and again. This feature makes it especially desirable in setting adjustment screws. Nylok nuts have high tensile strength, excellent heat resistance and are unaffected by most chemicals.

The Townsend Nylok Locknut is available in American Standard Light (E-6) and Light-Thick (E-7) series—in sizes ¼" through ⅜". It is a suitable companion to Townsend's Tufflok Nut which is a one-piece cold forged nut, with a hexagonal fibre washer as the locking medium. Both locknuts have been highly successful in offsetting vibration and shock. They have back of them Townsend's 135 years of experience in wire drawing and cold heading.

For information on how to save time, eliminate waste and produce better equipment with Townsend Locknuts, write for our locknut bulletin.

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an obligation to industry

Uninterrupted service is a cardinal principle in the furnishing of electrical power, an item of essential importance to the user. A transformer fire means more than the loss of electrical equipment and structures. Production losses from out-of-service time are non-replaceable.

Both utility companies and private users have for years been installing fire protection for key facilities. Through the relatively recent development of *Automatic* FIRE FOG, the safe use of water for the extinguishment of electrical equipment fires, protection of large and small indoor and outdoor electrical installations is now practical from an economic point of view.

Automatic FIRE FOG is specifically designed for your particular risk . . . electrically safe . . . approved by all leading insurance authorities.

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"AUTOMATIC" SPRINKLER CORP. OF AMERICA

Automatic

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"provides band fire protection for process equipment and storage in the chemical and petroleum industries. On-the-spot protection for quench tanks, ovens, explosive hazards, conveyor openings, air filters, oil filled electrical equipment and other units vital to production line operations.

"*Automatic*" *Sprinkler*

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Perlite Materials Available

To meet the demand of our present defense requirements and the even heavier requirements yet to come, many vital materials are now or will be soon in critical short supply. Great Lakes Carbon Corp., miners and processors of perlite, have announced that unique new materials processed from perlite are immediately available in quantity as substitutes or supplements for certain of these critically short materials.

Properties of the processed products that make them so unique and adaptable are their small sealed voids which account for their extreme light weight and excellent insulating properties, their high surface area and irregular shape and their mild abrasiveness.

In many industries, the processed products are now considered basic materials. Specially processed types are now sold in quantity to the oil industry for use in drilling and cementing of wells. Usefulness of these new products in foundries has been satisfactorily demonstrated and further tests are now under way. Industries that are using critically short materials for fillers, extenders, insulants, refractories, fire retardants, abrasives, etc., may wish to study the use of these new products as substitutes or supplementary materials.

Metal Plastic Coated

A patent was issued recently covering the coating of metallic articles with vinyl plastisols. Patent No. 2,350,232 was issued to John W. Donnell and Kenneth Tator, and assigned to Industrial Lining Engineers Inc., Pittsburgh. A licensing arrangement will be made available to interested parties such as coaters of plating racks, tanks and other metallic articles used in the plating, chemical and other industries.

Two Metal Powder Standards

Two standards designed to aid both the metal powder producing and consuming industries as well as the metal powder parts user have just been released by the Metal Powder Association. One, 14-51T, specifies the preferred dimensions and tolerances of oil impregnated metal powder bearings; the other, 15-51T, describes a method for determining green strength of compacted metal powders.

What's your Reason for Switching to Bull Dog V-Belts?

We've got four good reasons why you should use Bull Dog V-Belts:

2

MINIMUM STRETCH

A new, exclusive technique gives you this advantage — resulting in fewer takeup adjustments, reduced slippage and extended life of the belt.

1

DURABLE COVERS

The weave of a Bull Dog's heavy, bias cut fabric *could hardly be any closer!* That's why it withstands the punishing wearing action of the sheave while sealing the belt against moisture, grease and dirt.

3

STRONG, SPECIALLY ENGINEERED CORD SECTION

Yes, the high tensile strength of the BWH Cord Section is no trade secret. Nor is its superior load carrying capacity, ability to absorb shock loads.

4

TAKES HEAVIEST FLEXING

The BWH policy of constant research in the development of quality-controlled compounds pays off! How? By producing compounds for your V-Belts that run cooler and DO NOT CRACK OR DETERIORATE UNDER SEVERE FLEXING.

These Bull Dog V-Belt product advantages mean steady, uninterrupted belt performance — more for your belt dollar — more for your power dollar. Perhaps *that's* why you have already decided to switch to Bull Dogs!

TOUGH PROBLEMS INVITED

Ask us or your nearest BWH distributor about your power transmission belting, conveyor belting and hose problems. We're specialists in making mechanical rubber products work *better, longer.*

BWH

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BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

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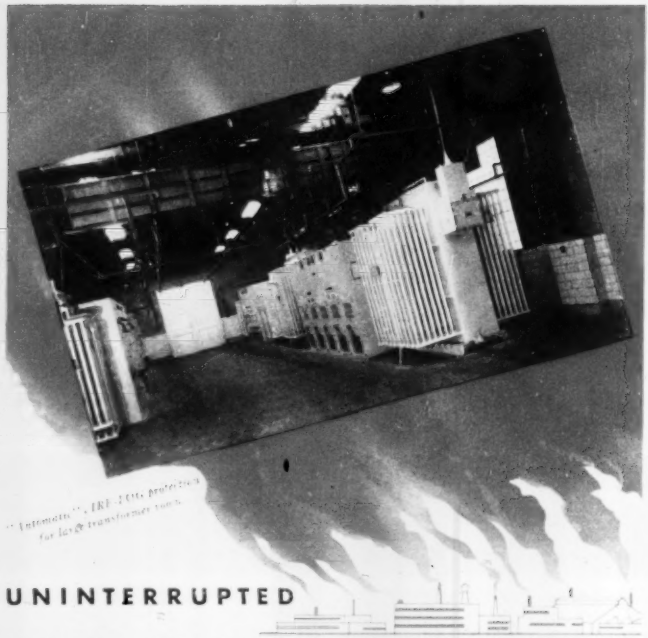

"Automatic" FIRE-FOG protects this lay-by transformer bank.

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an obligation to industry

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Automatic FIRE FOG is specifically designed for your particular risk . . . electrically safe . . . approved by all leading insurance authorities.

We'll be glad to furnish engineering counsel on *Automatic* FIRE FOG for your operations upon request . . . *no cost or obligation of course.*

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FIRE-FOG
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a famous member of the *Automatic Sprinkler* Family . . . provides basic fire protection for process equipment and storage in the chemical and petroleum industries. On-the-spot protection for quench tanks, dryers, explosive hazards, conveyor openings, air filters, oil filled electrical equipment and other units vital to production line operations.

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handling, wage incentives, maintenance and human relations. Copies may be secured for $3 from the society's headquarters at 35 E. Wacker Dr., Chicago, 1.

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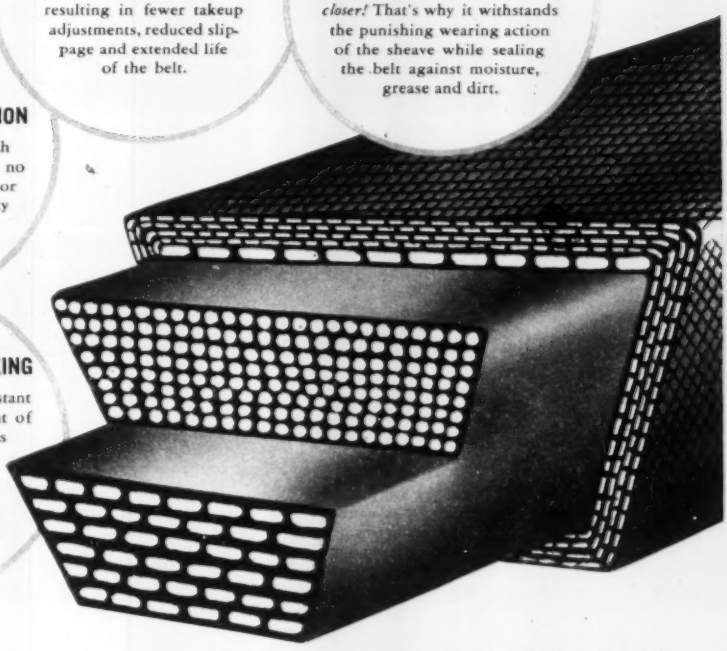

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New Books

Learning to Weld

New Lessons in Arc Welding; simulated, gold embossed leather cover, 320 pages, 6 x 9 inches; published by Lincoln Electric Co., Cleveland, for $1.00 postpaid in the United States, $1.50 elsewhere; available from STEEL, Penton Bldg., Cleveland 13, O.

This book is based on lessons and instruction given at the Lincoln Arc Welding School. Lessons are practical, not theoretical, and fully cover basic fundametals of arc welding as well as more advanced welding in alloys, sheet metal and pipe. The basic 32 lessons cover welding mild steel in all positions and 29 advanced lessons cover other welding applications. Practice materials, exercises, questions and answers are given for each lesson.

Practical information in the 163-page welding application section will help welding operators advance in knowledge and skill after the fundamentals have been mastered. Latest welding procedures for faster and lowest cost welding, automatic and semiautomatic hidden arc welding procedures, how metals are made and how to identify them, how to select correct welding joints and how to make common machine parts to use welding instead of casting are explained.

Helps in Selecting Metals

The Behavior of Engineering Metals, by H. W. Gillett; cloth, 395 pages, 5½ x 9 inches; published by John Wiley & Sons Inc., New York, for $6.50; available from STEEL, Penton Bldg., Cleveland 13, O.

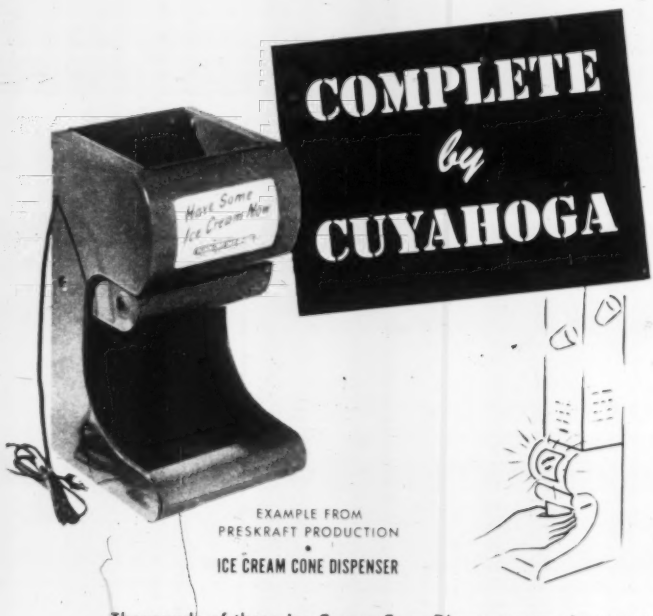
The purpose of this book is to help those who are not metallurgists but who participate in the selection of metals and alloys for engineering use. As it is intended to help in choosing suitable engineering materials, the behavior of these materials is discussed rather than the sometimes abstruse theories that seek to explain their behavior. Technical terms are used as little as possible and references have been selected, where a choice existed, for easy reading as well as for technical content.

Basic concepts of metallurgy are introduced in the first six chapters of the book. Terms are introduced in the natural sequence and examples show how they are used. The next nine chapters deal with the behavior of each of the principal commercial metals and alloys. Those materials of greater commercial importance are discussed in more detail than the less commonly used materials. The remaining chapters of the well-illustrated book are devoted to special considerations that may influence the selection of metals and alloys. These include such topics as machinability, special fabricating techniques, means of using or selecting metals so as to combat effects of corrosion wear and high temperatures; and some tricks of the trade. In the final chapter factors of cost and availability are discussed.

Ore Dressing Elements

Elements of Ore Dressing, by Arthur F. Taggart, professor of mineral engineering, School of Mines, Columbia University; cloth, 595 pages, 6 x 9 inches; published by John Wiley & Sons Inc., New York, for $10; available from STEEL, Penton Bldg., Cleveland 13, O.

In this book the author selects from ore dressing facts those that are necessary for engineering thinking on the subject and to correlate them so far as possible as an aid to memorization. He presents the empirical generalizations most commonly employed and explores, for the purposes of illustration, the ranges involved and



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Today, Acme-Gridley Automatics, by the hundreds, already are meeting the tolerances and time limits, turning out untold millions of these armament parts.

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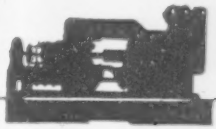

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No other source offers a line so COMPLETE—so much design and tooling EXPERIENCE in Multiple and Single Spindle Bar and Chucking Automatics.

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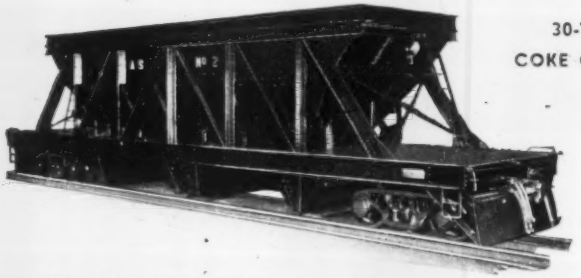
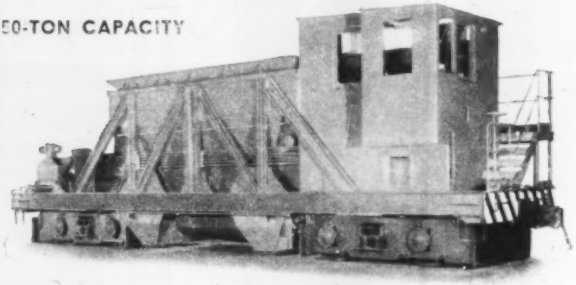


30-TON COKE CAR

CENTER BOTTOM DUMP

Trailer Type divided into two sections with rolling bottom dump gates controlled from locomotive cab. Car has self-aligning bearings, air brakes and standard safety equipment.

50-TON CAPACITY



BOTTOM DUMP ORE TRANSFER CAR

Car has overhung operator's station to provide good line of vision. Car has air-operated discharge gates, air brakes and air-operated pusher arm. This is latched in the safety position and can not be lowered unless manually released. Hopper equipped with electric heaters. Centralized lubrication is provided, including main journals on trucks.

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THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

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the magnitudes of the safety factors that must be applied in use. Theories that have proved their worth in design and control of operations are presented and examined. Recent advances in operating techniques in fine crushing, grinding, dewatering and sink-float concentration are included.

Throughout the book emphasis is on the analysis of machines and processes and the identification of their elements with established scientific laws rather than on structural and operating detail. Through the newly adapted flowsheet form and method of flowsheet analysis which the new form facilitates, consideration of mills as process units is stressed. The philosophy that a mill and all its parts comprise a single treatment process is a continuing theme throughout the book.

Beginning with an informative chapter on what ore dressing is and does, the author then gives an explanation of hand picking, screening, filtration and electrical concentration. After introducing sedimentation, he takes up acceleration in free settling, hindered settling, sink float, jigging, film and trough concentrators and shaking concentrators. A discussion of organic chemicals in flotation is followed by a detailed treatment of flotation. Final chapters deal with primary crushing, secondary crushing, grinding, transport and controls and flowsheets.

Better Materials Handling

Modern Methods of Materials Handling; cloth, 248 pages, 7½ x 11 inches; published by Prentice-Hall Inc., New York, for $5.50; available from STEEL, Penton Bldg., Cleveland 13, O.

Edited by the Material Handling Institute, the purpose of this book is to provide a broader basic knowledge to men in the materials handling division of industry. In the introduction, "An Approach to the Problem", how to decide on what type of equipment to use is discussed. Factors involved in developing new cost data for materials handling are also discussed. How a flow analysis chart and diagram can aid in obtaining more efficient handling operations is explained.

The well-illustrated book describes methods, types of equipment and materials in actual use. Use of materials handling equipment in these industries are described and illustrated: Aircraft, automotive, beverages, building material, drugs and chemicals, electrical, food products, foundry, glass, leather, metal products, oil and paint, paper products, printing and publishing, railroads, textiles, tire and

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It's easy to see how *less tool grinding* means less machine down time. And it saves because you make fewer tools. *Reducing the number of rejects* on Stainless jobs—getting the best possible finishes—can make a big difference in your unit production rate, too.

Many a customer of ours has found this a good formula for easier machining of Stainless. First use the Stainless that is *uniform* every time you get it—*Carpenter* Free-Machining Stainless. Then take advantage of the shop help Carpenter can give you.

For example, the men who work out of your nearby Carpenter Mill-Branch Warehouse will be glad to help out on any problems that come up. Or, we can give you a personal copy of the Carpenter "NOTEBOOK on Machining Stainless Steels". It's packed full of useful shop hints on turning, drilling, threading, milling, lubrication, etc. If you would like a copy, just write us a note on your company letterhead, indicating your title.

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rubber, warehousing. Problems of particular companies are given with the solution that was found by more efficient use of materials handling equipment.

Modern Process Operations

Unit Operations, by George Granger Brown and associates; cloth, 611 pages, 8 x 11 inches; published by John Wiley & Sons Inc., New York, for $7.50; available from STEEL, Penton Bldg., Cleveland 13, O.

The textbook presents a comprehensive treatment of modern process operations and stresses the similarity of their basic principles. Modern practice and equipment are emphasized as well as mathematical interpretations. The object is to build the student's knowledge and power progressively and continuously until he has a reasonably clear concept of how to approach the problems of design and operation of processing equipment. Unit operations are grouped according to similarities in action or in methods of calculation and presented in sequence according to increasing difficulty.

After an introduction to unit operations, the contents are divided into three parts: Solids, fluids, separation by mass transfer—the ideal stage concept.

Throughout the book the inductive method is generally followed relying upon observations from experience rather than upon deductive rationalizations. Kinetic explanations receive increasing emphasis in the last part of the book. Physics, calculus and a beginning course in material and energy balances or thermodynamics are assumed as prerequisites to unit operations.

Mr. Brown, the author, is the Edward DeMille Campbell university professor of chemical engineering and chairman of the department of chemical and metallurgical engineering at University of Michigan. His associates are Alan Shivers Foust, Donald LaVerne Katz, Richard Schneidewind, Robert Roy White, William Platt Wood, George Martin Brown, Lloyd Earl Brownell, Joseph J. Martin, George Brymer Williams, Julius Thomas Banchero, Jesse Louis York.

Assembly Suggestions

To help industry meet urgent defense production needs, Shakeproof Inc., a division of Illinois Tool Works, Chicago, offers a 24-page booklet entitled "Assembly Suggestions." Specially prepared to assist designers and product engineers in the selection of fastenings best suited for specific requirements, it contains details of the newest fastening developments.

Faster production in forging or cold coining operations, using less skilled labor yet holding ever closer tolerances in output—that's what manufacturers for defense or civilian needs are demanding today. Clearing meets those demands—all of them—with its new Series EF presses, which incorporate many improvements over previous Clearing forging presses.

Short-travel disc clutch and brake act faster to speed operation. Offset eccentric allows continuous guiding of extra long slide to assure maximum precision. Coordinated knockouts minimize contact time to keep dies cooler, longer lasting.

We can't tell the whole story here, but we'll gladly supply details at your request.

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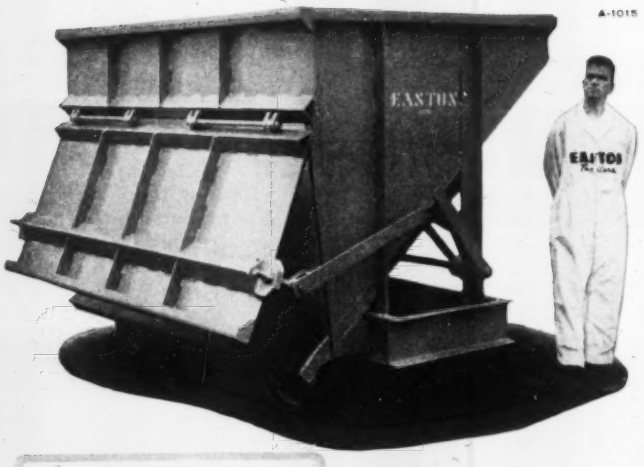

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Wittek Roll Feeds handle any type of coiled strip stock and are made in single roll, double roll, and compound types with straighteners, in models to feed in any of four directions. They are reliable and accurate with simple, quick adjustment of feed length. Standard sizes and models meet a wide variety of press size and capacity conditions.

Wittek Reel Stands facilitate handling coiled stock.

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CALENDAR OF MEETINGS

Denotes first listing in this column.

July 23-27, American Association for the Advancement of Science: Annual Gordon Research Conference on Corrosion, New London, N. H. Conference director's address: Dr. W. George Parks, Rhode Island State University, Providence, R. I.

July 30-Aug. 2, American Electroplaters' Society: Annual convention, Statler Hotel, Buffalo. Society address: P.O. Box 168, Jenkintown, Pa.

August 20-23, American Institute of Electrical Engineers: Pacific general meeting, Multnomah Hotel, Portland, Oreg. Institute address: 33 W. 39th St., New York 18.

August 20-23, National Association of Power Engineers Inc.: Annual meeting and exhibit, Hotel Plaza, San Antonio, Tex. Association address: 176 W. Adams St., Chicago 3.

Drills 24-Inch Holes

A specially developed series of Warner Electric clutches and brakes has been installed on the world's largest milling machine designed and manufactured by Ingersoll Milling Machine Co. Weighing approximately one million pounds, it can drill holes 2 feet in diameter in most types of metal, in addition to performing the normal milling operations.

Due to the tremendous weight and size of this machine, accurate positioning of the cutting tools was difficult to achieve. In moving the machine into position to complete the machining operation, split second stopping and starting were necessary.

In order to accomplish the accurate positioning and still maintain an efficient productive operating speed, electric clutches, brakes and associated high speed controls were specified.

Electric brakes and clutches are mounted principally on those parts of the machine which move up and down or from side to side. These moving parts contain the special cutting tools which machine metal.

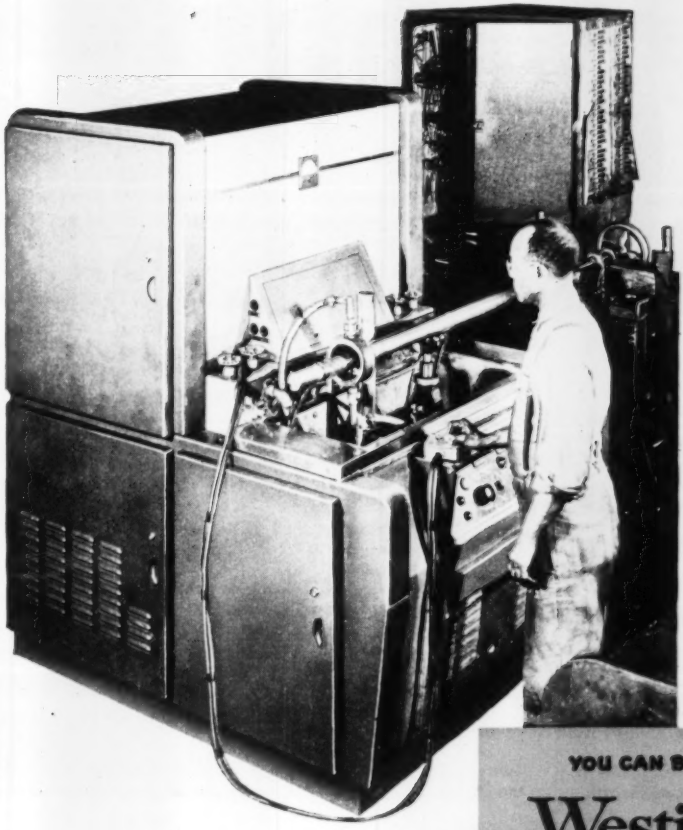
The milling machine with its simplified electric control system can be operated by one man. Actual operation is done by means of a pushbutton panel board, giving the operator overall visibility of the working surface and increasing the safety factor.

Bus Duct Manual Offered

A new 68-page manual describing types of bus duct and accessories available, and presenting application and test data, specifications, information on pricing a typical bus duct installation, and a typical bill of materials, is available from Westinghouse Electric Corp., Pittsburgh, by writing for it on your company letterhead.

RF INDUCTION HEATING...

Now even better than before



SURE – Miehle Printing Press and Manufacturing Company has been using induction heating on about 100 parts for years. They therefore know that for control, for quality, for savings in labor, floor space, and other costs (and for production increases) induction heating can't be beat.

AND – With this experience in mind, Miehle asked about new RF equipment to replace their old induction heating set-up.

THEN – Miehle purchased a Westinghouse 20 KW-450 KC RF Generator. It's used for brazing, hardening and annealing of printing press parts in job-lots. RESULTS: Production up more than 20%, costs cut accordingly (over the former equipment which had already shown clear gains over other methods!).

You, too, can save space, time, and money with Westinghouse RF heating equipment. Write today to Westinghouse Electric Corporation, 2519 Wilkens Avenue, Baltimore 3, Maryland. Outline your specific needs.

J-02227

YOU CAN BE SURE...IF IT'S

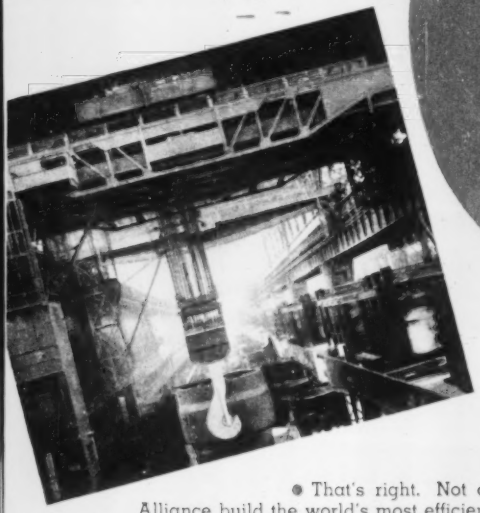
Westinghouse

INDUCTION HEATING

BIG BIGGER BIGGEST

OPEN HEARTH CRANES

LAMINATED LADLE HOOKS
ORIGINATED BY
THE ALLIANCE MACHINE COMPANY



● That's right. Not only does Alliance build the world's most efficient cranes . . . Alliance builds the biggest!

Cranes for hot metals, raw materials, finished products . . . Alliance builds them all.

Alliance cranes are safer, easier and more economical to operate and they're always built for your specific requirements.

United States Steel, for example, will use a special twenty-four wheel Alliance Open Hearth Crane in their new Fairless Works at Morristown, Pa.

This 400 "tonner" will be **the biggest Open Hearth Ladle Crane in the world**—engineered to perfection so the load is always distributed equally, each wheel taking a proportional share of the load.

Alliance experience covers a wide range of industries. This year we are celebrating our Fiftieth Anniversary serving the steel industry throughout the world.

Alliance engineers will be happy to discuss ways to give your plant extra lifting power for the days ahead. Write for a consultation.

THE ALLIANCE MACHINE COMPANY

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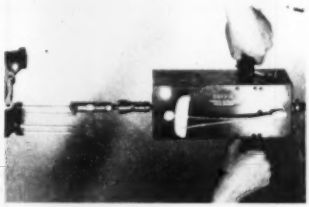
LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION

New Products and Equipment

Torque Measured Automatically

Garvin torque indicating driver made by Tru-Circle Products Co., P. O. Box 536, South Bend, Ind., positively and automatically measures the torque as it drives studs, nuts, screws or fasteners. Stud breakage and scrap loss are reduced and manpower is not wasted on hand-torquing inspection.

Unit is built around a standard deflection-type torque wrench with minimum and maximum torque indicated by the wrench and indicating



lights. Green light is used for minimum torque and red light for maximum torque. Driver is made in 0-100, 0-350, 0-500, 0-750, 0-1500 and 0-2000 inch-pound capacities. The smallest model is portable and the larger units are mounted on radial drill press type arms.

Check No. 1 on Reply Card for more Details

Dual Purpose Assembler

Either three or four different sizes of cam shaft bushings can be assembled into four or six cylinder diesel engine blocks weighing up to 950 pounds in one operation on a press made by Oilgear Co., 1560 W. Pierce St., Milwaukee 4, Wis. Features of the press are: Semiautomatic, interlocked, electric-hydraulic control; alternative manual pushbutton control, variable pressing and return speeds, hydraulic elevator; positive block location; dual purpose horn; reduction of operator's work to slipping split bushings on pins, keeper rings on bushings and guiding block to assembling position.

With selector switch at "auto" semiautomatic operation is started by depressing dual safety pushbuttons. Until bushings are in place and block is in approximate assembling position elevator will not raise block or operate ram. When block is in position the hydraulic elevator raises block, locates pan rail surface over dowel pins and holds block in assembling position, main ram pulls bushings home in block a preset distance, pressure reverses cycle to first return main ram and then lower elevator to unloading position. Block is then pushed onto conveyor and another block is moved into press.

Check No. 2 on Reply Card for more Details

Turret Bearings Redesigned

Redesign of bearings in the Lign-o-matic turret made by Howe and Fant Inc., 531 Flaxhill Rd., South Norwalk, Conn., gives longer life and precision. Bearings permit the spindles to move laterally and angularly as well as to rotate. When drilling machine spindle is lowered, tapered surface of a driver engages the mating tapered surface of a turret spindle. Bearing construction allows turret spindle to be moved into exact alignment with the drilling machine spindle. The turret spindle is locked in position and cannot get out of alignment during the drilling operation.

Overall runout is reduced to less than 0.0001-inch. Hollow spindles reduce weight and permit sustained accuracy at high operating speeds.

Check No. 3 on Reply Card for more Details

Maintenance Minimized

Heavy box type 4-way bed horizontal boring, milling and drilling machine made by Bullard Co., Bridgeport 2, Conn., is built in 4 or 5-inch spindle sizes. Bed supports equally on its four ways a heavy ribbed box type saddle and table. Bed ways are covered by stationary sheet metal guards as a protection from chips and other foreign materials. Nonmetallic bearing surfaces are used under both saddle and table to provide long wearing replaceable bearing surfaces. Saddle guide and feed screw, located between inner bed ways, minimize any cocking tendency due to uneven load distribution. Single lever, self-equalizing clamps acting on the outside of the outer bed ways give maximum hold-down effect.

An improved type of hydro-dynamic coupling and brake motor, driving through multiple v-belt, gives smooth, positive acceleration and stops as well as absorbing shock induced by interrupted cuts in heavy work. The 4-inch spindle machine has a range of 24 speeds from 8 to 1000 rpm while the 5-inch size has 24 speeds from 7 to 850 rpm.

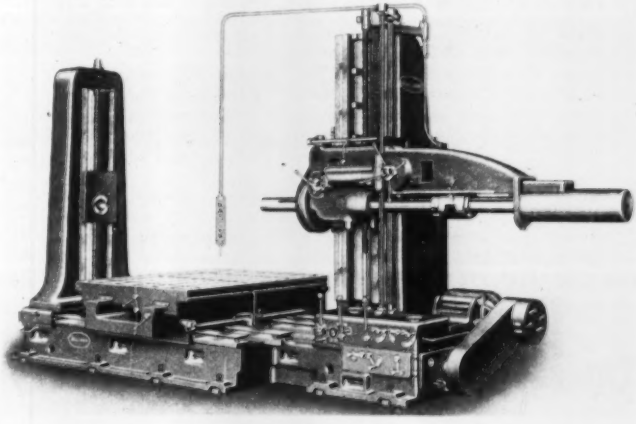
Check No. 4 on Reply Card for more Details

Quality Control Aid

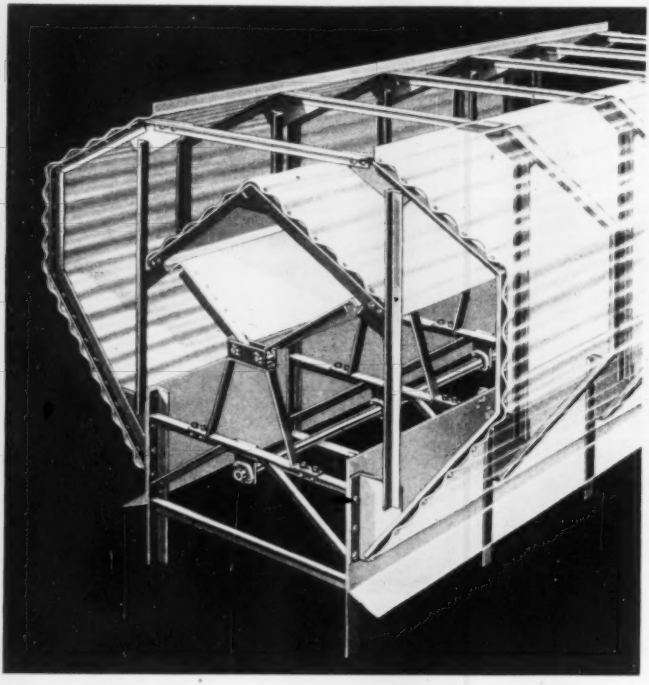
An electrical device for automatically keeping track of the sampling procedure in quality control is announced by the Special Products Division, General Electric Co., Schenectady 5, N. Y. The monitor is designed to eliminate the complexity

of paper work that is inherent in continuous sampling methods of quality control.

An electric counter set to any predetermined number from 1 to 400 automatically keeps track of the clearance number. When the counter



WHEN LABOR SLOWS DOWN



REVITALIZE WITH BURT MONOVENT VENTILATORS

Fresh air is your best assurance of active, "working" employees. Bad air slows production.

Heat, smoke and fumes can be replaced by fresh, live air economically with the Burt Monovent Continuous Ridge Ventilator. Installed on any type roof, it functions as a giant exhaust valve along the entire length of the structure. A complete range of sizes from 4" to 96" handles almost any application.

Simple to maintain, fool-proof and easy to install, the Burt Monovent is an investment that soon pays its way in improved production. See Sweet's for further details or write for Bulletin S.P.V. 6.

FAN & GRAVITY VENTILATORS • LOUVERS • SHEET METAL SPECIALTIES

The Burt Manufacturing Company

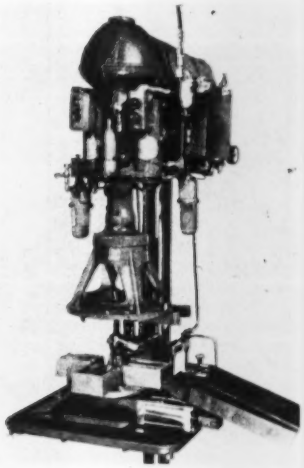
905 So. High St. Akron II, Ohio

reaches the set number, contact is broken and the white sampling light goes on indicating that the predetermined number of acceptable units has been inspected and that sampling can resume. Percentage inspection or sampling may vary from 1 per cent to 50 per cent, depending on the desired average outgoing quality of level (AOQL). Unit requires 110 v and has a maximum counting speed of 500 units per minute.

Check No. 5 on Reply Card for more Details

Air-Controlled Drilling

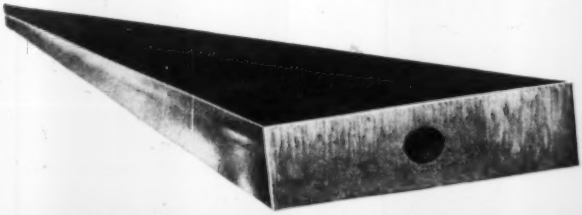
Beckett-Harcum Co., 1140 Wayne Rd., Wilmington, O., is manufacturing high production tapping and drilling



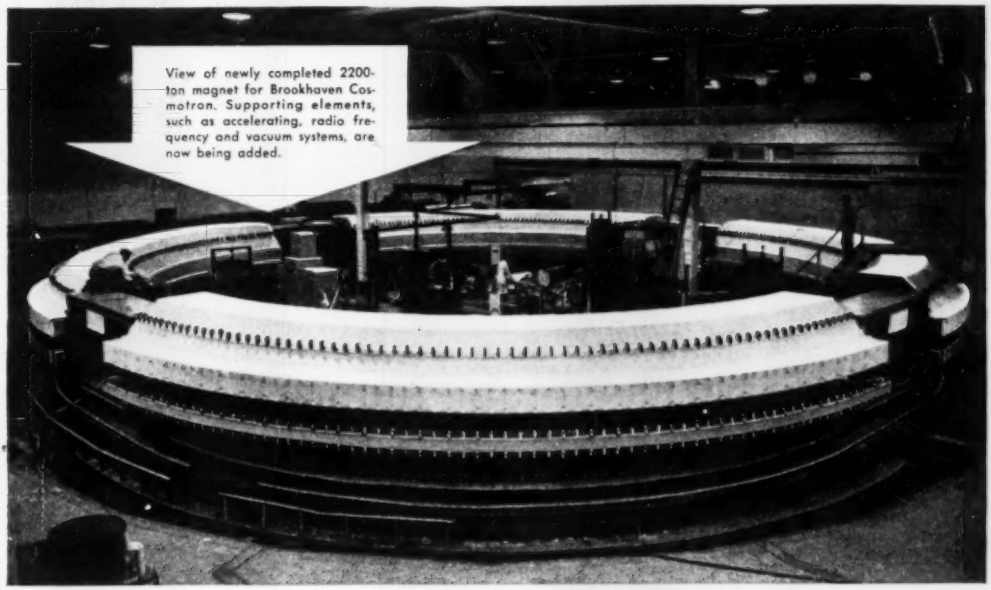
machines that can be equipped with automatic, air-controlled multiple spindle heads and index tables. Multiple tapping can be performed from a multiple drill head without lead screws or clutches. Very light air pressure permits the taps to provide their own lead, no forcing of the tap or galling action results. Class 2 and 3 fits can be obtained in metals as soft as magnesium as well as in stainless and chrome molybdenum steels.

Multiple tapping is accomplished with a special high reversal motor which reverses the taps when they reach desired depth. By reversing the motor, taps lead out without stripping the last thread even in extruded holes in very soft metals. Motor is capable of a complete cycle every three seconds. By switching out the motor reversing control, drilling operations can be performed and the same fixtures used for drilling may be used for tapping by removing the drill bushings. In drilling operation any desired

COPPER—most useful metal known to man



End section of AnacondA soft annealed copper bar used as magnet winding for new Brookhaven Cosmotron. Bars were produced in cross sections of 2.182" x .750" and 1.875" x .750" in lengths up to 52'-6" and 47'-8" respectively.



View of newly completed 2200-ton magnet for Brookhaven Cosmotron. Supporting elements, such as accelerating, radio frequency and vacuum systems, are now being added.

. . . to discipline a cosmic ray

At Brookhaven National Laboratory on Long Island, N. Y., devoted to fundamental study of nuclear forces and development of uses of atomic energy, the world's newest and largest atomic accelerator has just passed preliminary tests of its giant magnet.

Known as the Cosmotron, its job will be to help understand the origin of the nuclear forces which are responsible for atomic energy. The Cosmotron — so named because it will be used to produce artificial cosmic rays—is designed to speed protons to an energy exceeding two billion electron volts, or five times that of the most powerful existing accelerators.

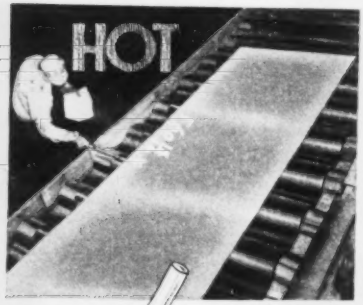
Holding these particles in their precise path is accomplished by a giant magnet with windings made of 23,000 feet of high conductivity, soft annealed copper bar with a uniform hole slightly less than $\frac{3}{8}$" diameter throughout the entire length to carry cooling water. One hundred and fifty thousand pounds of these bars, in two sizes of cross section and in lengths up to 52'-6", were extruded on a 2500-ton press at the Buffalo Branch of The American Brass Company.

We don't anticipate receiving many orders for cosmotron magnet windings. But we think the technical problems of this project indicate the breadth of service Anaconda offers to Industry. The experience and help of Anaconda's Technical Department are always freely available to you wherever copper and its alloys are involved. Just write to The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

first in Copper, Brass and Bronze ANACONDA®

"15 Cents - - Saved us $15,000.00"

Says Steel Man



"Poor identification made with an inferior crayon burned off. In error, a soft iron slab went through the rolls which were set for a high carbon slab, causing a cobble and ruining the rolls, with a big loss of time. MARKAL PAINTSTIKS stopped this waste of money, time and production."

MARKAL PAINTSTIKS

Marking HOT Plates at 1800° F

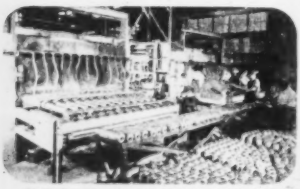
are PERMANENT—Weatherproof, Fadeproof

Proved performance for HOT CASTINGS • STICKERS
COILS • PLATES • FORGINGS • ANNEALING • WELDING

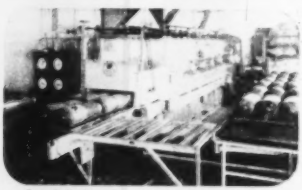
Don't be mis-led! There's only one MARKAL PAINTSTIK—*the Original!*

Write for FREE SAMPLE. We'll gladly help with any marking problem. Ask us.

MARKAL CO. 3089 W. Carroll Ave. Chicago 12, Ill.
"Originators of Paintstiks"



Shell Forgings 75 mm, 90 mm, 105 mm and other sizes are annealed, hardened, tempered, normalized and stress relieved in these and other EF gas fired installations.



Gas Cylinders Compressed gas cylinders or tanks are heat-treated, normalized and annealed in these and other EF gas fired furnaces.

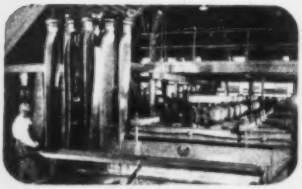
Typical EF Furnace Installations for

Defense Production

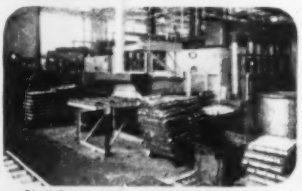
We have the drawings and have already built these and many other defense production furnaces. Years of experience and complete manufacturing facilities enable us to give dependable service on furnaces for treating jet or propeller type engine parts; tank, automotive or aircraft parts; armor plate; metal powder products, ammunition components and other defense products.

Ask for Bulletin 461-DP

THE ELECTRIC FURNACE CO. • SALEM, OHIO
GAS, OIL OR ELECTRIC FURNACES, FOR ANY PRODUCT, PROCESS OR PRODUCTION



Aircraft Parts Propeller blades are uniformly heated and quenched in this EF continuous furnace. Types available for other propeller and jet type engine and aircraft parts.



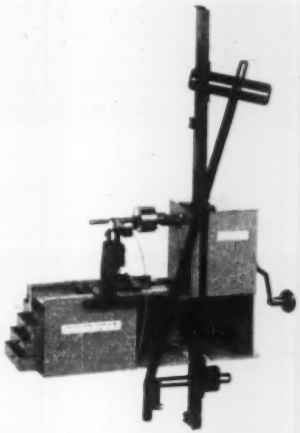
Shell Cases A battery of EF gas fired radiant tube continuous type atmosphere clean annealing and stress relieving furnaces. Other types available for steel or brass.

a.r pressure can be obtained up to 1250 pounds using a 100-pound air line.

Check No. 6 on Reply Card for more Details

Hand-Operated Spring Coiler

A hand-operated spring coiling machine is available from Carlson Co., 277 Broadway, New York 7, N. Y., for making compression, extension and torsion springs. Coiler No. 2 supplements and doubles the capacity of an earlier and smaller model No. 1. It is useful for making experimental or sample springs and for short production runs up to about 500 pieces, as the setup time is short and the output is up to 300 precision springs per hour.



Compression springs can be wound up to 8 inches long with any number of coils up to 30, to any pitch up to 1 inch and with end coils closed or squared automatically on both ends. Extension and torsion springs can be wound tight or loose up to 8 inches long either left or right hand, up to 150 coils with extended arms on both ends up to 5 inches long. Outside diameters up to 2 inches and wire diameter from 0.041-inch to 0.156-inch can be coiled.

Check No. 7 on Reply Card for more Details

Tapper Sensitivity

High speed sensitive tapping machine is a development of Ettco Tool Co., 594 Johnson Ave., Brooklyn 6, N. Y. Machine is built for either single spindle tapping units or multiple heads with provision for quick changeover. A feature of the machine is that no skill or delicate touch is required. Tapping action is con-

NEW WEIRTON TINPLATING PROCESS

Saves 25% to 50% tin!

RELEASES CRITICAL METAL FOR MILITARY USES

An entirely new and revolutionary electro-tinplating process recently perfected by Weirton Steel Company results in new savings in tin amounting to as much as 50 per cent over previous quantities used.

Individual sheets of steel destined for tin can fabrication are plated on one side with an amount of tin necessary to protect the ultimate contents of the can, and on the other side with only the amount of tin necessary to protect the outside of the can from exposure. A new data sheet reveals the immensity of the savings in this critical metal.

Weirton's new development can well prove to be a two-edged sword in national defense; it will not only result in tremendous savings of pig tin for military purposes but will at the same time increase the production of tinplate for vital food packing and container industries.

NEW ELECTROLYTIC TIN COATING DATA SHEET OF WEIRTON STEEL COMPANY

.25# Basis One Side / .50# Basis Reverse Side	In Lieu of .50# Basis Both Sides
Average Coating	.375#
Metal Savings Per Base Box	.125#
Metal Savings—Per Cent	25.0%
Increase in Area	33.3%

.25# Basis One Side / 1.00# Basis Reverse Side	In Lieu of 1.25# Basis Both Sides
Average Coating	.625#
Metal Savings Per Base Box	.625#
Metal Savings—Per Cent	50.0%
Increase in Area	100.0%

.50# Basis One Side / 1.00# Basis Reverse Side	In Lieu of 1.25# Basis Both Sides
Average Coating	.750#
Metal Savings Per Base Box	.500#
Metal Savings—Per Cent	40.0%
Increase in Area	66.7%

.25# Basis One Side / .75# Basis Reverse Side	In Lieu of .75# Basis Both Sides
Average Coating	.500#
Metal Savings Per Base Box	.250#
Metal Savings—Per Cent	33.3%
Increase in Area	50.0%

.375# Basis One Side / 1.00# Basis Reverse Side	In Lieu of 1.25# Basis Both Sides
Average Coating	.6875#
Metal Savings Per Base Box	.5625#
Metal Savings—Per Cent	45.0%
Increase in Area	81.8%

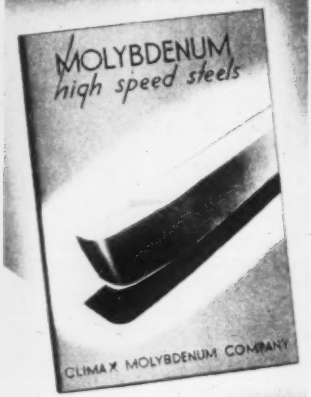
.50# Basis One Side / .75# Basis Reverse Side	In Lieu of .75# Base Both Sides
Average Coating	.625#
Metal Savings Per Base Box	.125#
Metal Savings—Per Cent	16.7%
Increase in Area	20.0%

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

It's easy to learn to treat Molybdenum High Speed Steel



FREE—this booklet gives all the facts

Data on performance, heat treatment and other authoritative facts are available in our booklet "Molybdenum High Speed Steels".

More and more high speed steel will be of the Molybdenum types which are already giving performance equal to or better than tungsten steel, with economy in alloy content.

Climax Molybdenum Company
500 Fifth Avenue · New York City

Please send your FREE BOOKLET
"MOLYBDENUM HIGH SPEED STEELS"

Name .....
Position .....
Company .....
Address .....

S-7 HS-7

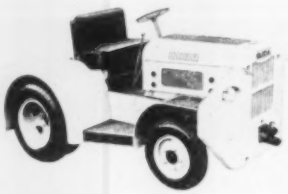
trolled through an adjustable pull spring inside the centerless ground column. Whenever the foot treadle is pressed down by foot or air, the spring feeds the tap into work and gives automatic protection against tap breakage or faulty threads.

Two oil tanks are built in the machine. One in the head supplies gravity fed oil for light lubrication and the other in base is for use with

an oil pump when a steady flow of oil is required. Built-in stripper plate permits use of simple work holders and is used to strip part from tap. It also holds lubrication tube and brush.

Torque Converter for Tractor

A 12,000 pound drawbar pull tractor with torque converter is being manufactured by Buda Co., Harvey, Ill. Model HA-120 tractor with a single stage, closed circuit type torque converter eliminates shock and



strain and smoothly applies maximum power even when starting under full load conditions.

Unit is powered with a 6 cylinder, 230 cubic inch displacement gasoline engine but a diesel engine of the same displacement and interchangeable mounting dimensions can be supplied. Tractor has four-wheel hydraulic brakes, heavy duty transmis-

WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11
WHAT'S THE MOST ECONOMICAL WAY?
See page 9

This FREE booklet on Metal Cleaning helps you get better production, larger profits. Among its subjects are:

Machine cleaning	Tank cleaning
Electrocleaning	Pickling
Pre-paint treatment	Burnishing
Steam-gun cleaning	Rust prevention

FREE Write Oakite Products, Inc., 34E Thames St., New York 6, N. Y., for the 44-page booklet: *"Some good things to know about Metal Cleaning."*

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE

WHAT'S THE BEST WAY TO STRIP PAINT FROM METAL PARTS TOO LARGE TO BE SOAKED IN TANKS?
See page 3

This FREE booklet on Paint Stripping helps you plan better procedures. Read more about:

¶How to strip large areas of structural metal? *See page 5.*

¶How to strip metal parts in large volume? *See page 9.*

¶How to strip oil-base paints? synthetic enamels? lacquers? alkyds? phenolics? ureas? *See page 12.*

FREE Write Oakite Products, Inc., 34E Thames St., New York 6, N. Y., for this 14-page booklet: *"How to Strip Paint."*

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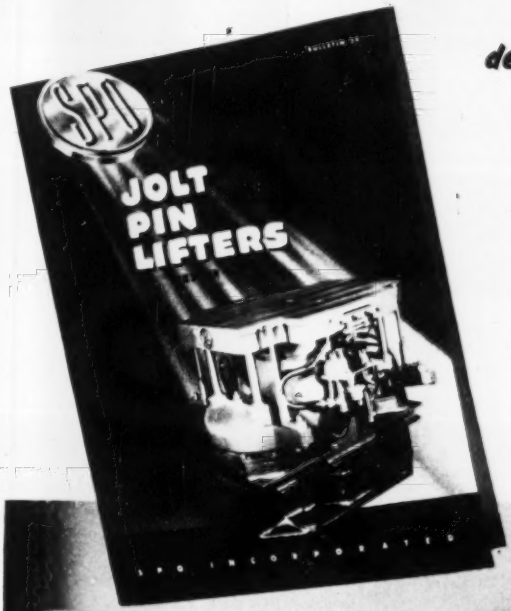
MATERIALS · METHODS · SERVICE

Technical Service Representatives Located in Principal Cities of United States and Canada

Molding Machines



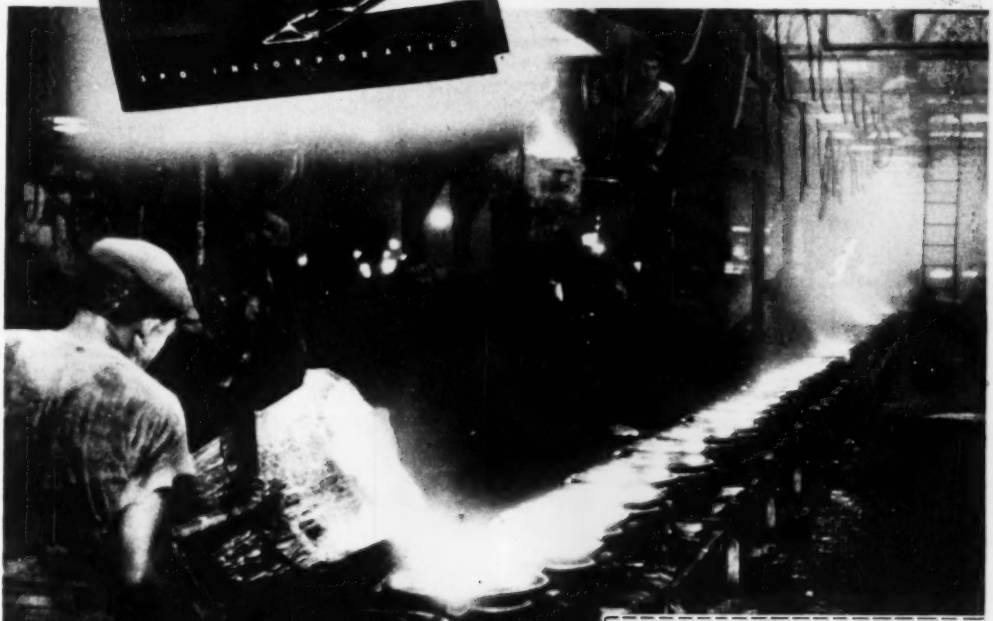
New Bulletin describes SPO line of Jolt Pin Lifters

Complete data on the Series 3000 high-production jolt pin lifters are presented in this new illustrated catalog which is available to foundry management and purchasing personnel such as superintendents, foremen, production expediters, etc. Designed for maximum speed, safety and ease of operation, these machines feature the patented SPO "inverted jolt" mechanism.

The jolt pin lifters described in this publication have jolt capacities ranging from 750 to 4000 pounds and are fully adjustable to meet diversified production demands. Pivot type adjustable lifting pins will accommodate any type or size of flask within their capacities. Both breakaway and secondary draw speeds can be adjusted to different job requirements, and jolt impact intensity of each machine is variable.

In this catalog, dimensions, capacities, pattern draw, SPO vibrator size and other pertinent data are tabulated for quick reference. Photographs and line drawings depict the construction and features of the various machines.

Bulletin No. 30 will be sent upon receipt of coupon or letterhead request.



SPO INCORPORATED

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SPO, Incorporated

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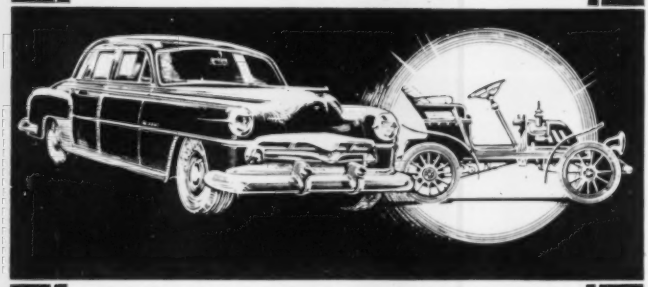
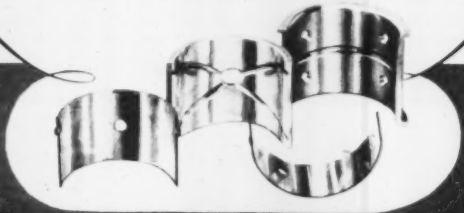
JOHNSON BEARINGS
1901-1951



We grew up with the Automobile Industry

GROWING UP together, working together for the past fifty years, the automobile builders and Johnson Bronze have made tremendous progress. Engineering cooperation made possible higher compression, higher speeds, and greater durability in automobiles. Such cooperation in many industries has been responsible for new bearing developments—changes in bearing design, new conceptions of precision, refinement of alloys, and new bearing metals. As a result, today's Johnson Sleeve Bearings are the most accurate and the best we have ever produced. The line is complete . . . cast bronze, babbitt lined bronze, babbitt-on-steel, bronze-on-steel, powder metallurgy, and aluminum alloy. We will gladly study your requirements and make recommendations on types and designs of bearings needed. Write today.



SLEEVE BEARING HEADQUARTERS Since 1901

Johnson Bronze

550 SOUTH MILL STREET · NEW CASTLE, PA.

sion with four forward and one reverse speed, an adjustable seat and a 17-gallon Protectoseal fuel tank.

Check No. 9 on Reply Card for more Details

Rotating Clamp Added

Rotating roll clamp designed for attachment to fork trucks of 2000-pound capacity is announced by Clark Equipment Co., Industrial Truck Division, Battle Creek, Mich. It is designed to handle rolls of not over 1500 pounds on 2024 models and of not over 950 pounds on 2015 models. Unit can be rotated through 90 degrees so that roll can be picked up from horizontal position and stood on end, or vice versa. It is rotated by a cylinder with chain and sprocket linkage and is provided with positive

stops at vertical and horizontal positions to eliminate excessive strains on chain.

One clamp arm is rigidly mounted and when rotated is always in bottom position for handling horizontal rolls. Second clamp arm is hydraulically actuated and provides a maximum clamping force of 5000 pounds. Clamp pads are hinge-mounted to fit against the roll and exert maximum pressure over the entire surface. Manually operated relief valve permits adjustment of hydraulic pressures to suit rolls varying as to size and weight.

Check No. 10 on Reply Card for more Details

Sensitive Oscillograph

Series ES-500A cathode ray oscillograph is introduced by Precision Apparatus Co. Inc., 92-27 Horace Harding Blvd., Elmhurst, L. I., N. Y. It has an extended range push-pull vertical amplifier with response beyond 1 mc, 2 megohm input resistance, approximately 20 mmfd input capacity and voltage is regulated for utmost stability.

Better than 20 millivolts per inch vertical amplifier sensitivity permits direct alignment and adjustment of low gain circuits and examination of minute signal levels. Unit has a cali-

This New Controller Says "Hurry Up, Furnace!"

With production reaching toward all-time highs, this new P.A.T. 50 Control already is helping many key plants increase the output of their furnaces. Here's why:

This Control has something that's brand new in proportional, electric controllers. Called "rate action," this feature enables the Controller to act on the *speed* of swings in furnace load, as well as on their size and on the length of time they persist. Thus, if temperature changes gently, it is gently nudged back into line. But if it starts off vigorously—as when the furnace door is opened—P.A.T. 50 reacts vigorously. Then, when the change has been headed off, the Controller starts to back away. But "putting on the brakes" it brings temperature in line smoothly and rapidly.

Thus, "Rate Action" increases production because it reduces the length of time a furnace is off temperature.

Also, Proportioning and Reset Actions are more responsive than before. These two components stop the normal temperature swings which are started by changes in the size and permanence of the furnace load. Even without rate action, these increases would enable P.A.T. 50 to do a better-than-ever job. With rate action, results are superior to any previous electric control.

The News is in the Control Unit at bottom of panel shown at right. Earlier installations can be converted to P.A.T. 50 by replacing the Unit and making slight changes in the Controller.

For details, contact our nearest office, or write us at 4957 Stenton Ave., Philadelphia 44, Pa.

THESE furnaces and controllers are part of the slab-heating equipment with which The Timken Roller Bearing Company, Canton, O., conditions high-alloy steels for rolling. The Timken Company has used many earlier L&N Controllers. They find P.A.T. 50 is a further step forward, not only in guarding quality, but also in increasing production by shortening the off-temperature time.

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

LEEDS & NORTHRUP CO.

Jel. Ad ND4 660(1)

brated, frequency compensated, wide band V input step-attenuator. Extended range, push-pull horizontal amplifier gives response beyond 1 mc. Input resistance is $\frac{1}{2}$-megohm and input capacity is approximately 20 mmfd. Multi-vibrator type internal linear sweep circuit affords direct coverage from 10 cycles to 30 kc. A vertical phase-reversing switch permits inversion of test patterns.

Check No. 11 on Reply Card for more Details

Tapping Attachment

Lead screw tapping attachment offered by Automatic Methods Inc., Newark, N. J., is a support arm attachment for any standard drill press. Utilizing the Jacob Rubberflex collet, taps of all standard sizes ranging from 0 to $\frac{1}{4}$-inch may be used without changing the collet. The unit is available to fit 14 and 15-inch drill presses.

Check No. 12 on Reply Card for more Details

Patented Spindle Nose

An advantage of the patented Thread-Lock spindle nose, introduced by Wade Tool Co., Waltham, Mass., is that the chuck is located and locked with one half turn of the locking ring. The American standard taper D1-3 is used in conjunction with the company's Thread-Lock principle.

Check No. 13 on Reply Card for more Details

Electrical Control Device

Sensivolt, developed by Sola Electric Co., Chicago, Ill., controls electrical machinery by reacting to very slight changes in the voltage of alternating current. With this device it is possible to have a static alternating current voltage sensitive control capable of differentiating small changes in alternating current voltage and handling large amounts of power.

Check No. 14 on Reply Card for more Details

Heat Resistant Paint

M-aluminum, a new heat resistant paint for moderately high temperatures (200 to 700° F) is available from Speco Inc., Cleveland 9, O. It is suitable for both interior and exterior use and brush or spray application.

Check No. 15 on Reply Card for more Details

Tool Blocks

Rotangular tool blocks, made by George E. Snyder, Philadelphia 24, Pa., are designed for use on surface grinders to expedite grinding of faces of prismatic punches where accuracy obtainable with dividing heads is inadequate and where precise setting up by other methods from one face to another is time consuming. Only one clamp-up of workpiece is needed with these blocks to generate a square, octagon, triangle, hexagon or composite shape.

Check No. 16 on Reply Card for more Details

Multiuse Center

A bull nose, replaceable point center, designed so that the bull point can be removed quickly and another bull point inserted to accommodate the work without having to remove the center on the machine, is introduced by Ready Tool Co., Bridgeport, Conn. Designed as RED-E-Super-accurate multipurpose center, it is available in any required shank, taper or head size.

Check No. 17 on Reply Card for more Details

Flooring Compound

Wilbur & Williams Co., Brighton 35, Mass., offers a rubber-coat skid grip flooring compound that can be easily brushed on. It may be applied on metal, wood or concrete. It eliminates danger of slipping even under wet conditions.

Check No. 18 on Reply Card for more Details

Saves Operating Expense

Lower operating expense and reduced space requirements for control panels are available with the new miniature indicators and control units made by Bailey Meter Co., Cleveland 10, O. Designated as Mini-Line, the instruments make it practical to concentrate into a small space before a single operator all information and controls for operating one or more boilers, turbines or process units.

Check No. 19 on Reply Card for more Details

Heavy Duty End Mills

Heavy duty end mills with 2-inch diameter shanks and fast cutting helix are available from Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn. Cutters have ample chip clearance for taking heavy end milling cuts. They range in diameter from 2 to $2\frac{1}{2}$ inches and in length of cut from 4 to 6 inches.

Check No. 20 on Reply Card for more Details

Synthetic Resin Cement

Atlas Mineral Products Co., Mertztown, Pa., offers Vitroplast, a light colored synthetic resin cement that is resistant to many acids, solvents, greases and oxidizing agents such as sodium hypochlorite and chlorine dioxide. It sets hard in contact with concrete and metals and shows good adhesion properties for joining of brick and tile and adhering glass, concrete, metal and other materials.

Check No. 21 on Reply Card for more Details

Masonry Cutting Blade

Clipper Mfg. Co., Kansas City 8, Mo., announces the new B-R (break resistant) abrasive blade for masonry cutting. It is recommended for limestone, sandstone, light aggregate concrete products and dry press refractories, transite, etc. It will not damage if it is dropped, twisted or bent.

Check No. 22 on Reply Card for more Details

Gas-Fired Unit Heaters

A new line of gas-fired unit heaters including fan, blower and duct-type models, with sheet steel and cast iron heat exchangers is announced by United States Air Conditioning Corp., Minneapolis 14, Minn. Four point suspension permits rigid mounting without strain on gas lines or piping. Units are designed so that all heat generated by burning gas is delivered directly to the heat exchangers and then to the circulating air.

Check No. 23 on Reply Card for more Details

Protective Gas Atmosphere

Atmosand powder, developed by Marlyn Chemical Co. Inc., Calumet City, Ill., provides protective atmospheres of hydrogen, carbon monoxide and nitrogen suitable for use in non-generator equipped furnaces, induction and resistance heaters, etc., to prevent bluing, scaling and decarburization. It is nontoxic, nonflammable and free flowing.

Check No. 24 on Reply Card for more Details

Foot-Operated Valves

Quick-As-Wink foot-operated valves permit hammers, shears, presses, furnace doors and other types of air-operated machinery and equipment to be fully controlled by foot pressure on a pedal. Made by C. B. Hunt & Son Inc., Salem, O., the valving mechanism has a stainless steel body and push-pull rods, brass sleeves, and self-sealing U-shaped packers. Sizes are $\frac{3}{8}$ to 1 inch, in 3-way, 4-way, neutral position and regular actions.

Check No. 25 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

75. Grinding Equipment

Hardinge Co.—12-page illustrated bulletin No. 25-C contains general discussion of correct field of application of rod mills for both wet and dry grinding. It covers methods of construction, specifications and design features of conical, flanged-end and convex head rod mills of both trunnion overflow and peripheral discharge types.

76. Fastening Specialties

Indiana Metal Products Corp., Div. of Camcar Screw & Mfg. Corp.—Phillips, Clutch, hex and slotted machine screws; Sems preassembled lock washers and screws; combination bolts and plates; staking type screws; and special screws and studs are shown in 4-page illustrated folder "Pick a Winner". All are available from stock or made to customer specification.

77. Steel Procurement

Detroit Steel Corp., Reliance Steel Div. — 16-page booklet "Something About Warehouse Ways of Improving Your Steel-Getting Chances" relates how user can better his steel supply situation.

78. Automatic Bar Machines

Cone Automatic Machine Co.—16-page illustrated bulletin explains features and advantages of six-spindle Conomatic automatic bar machines. Typical components discussed include collet operating mechanism, work spindle support, main cross slides, power feed change gears, rapid traverse brake and motor and electrical equipment.

79. Dieing Machines

Henry & Wright Div., Emhart Mfg. Co.—40-page illustrated catalog 51 presents specifications of dieing machines for every stamping and punching operation. Also described are automatic feeds, scrap cutters, staking chutes, automatic power straighteners, automatic reels and other accessory equipment. Typical parts produced with plain and progressive dies are shown.

80. Precision Gage Blocks

Webber Gage Co.—Complete data including manufacture, physical characteristics, fixtures and applications are given in "Gage Block" catalog which describes steel and carbide blocks and available accessories. Gage block care and acceptable method of combining gage blocks to fit a given dimension are covered also.

81. Tumble Finishing Equipment

Crown Rheostat & Supply Co.—Illustrated catalog outlines features of Crown tumble finishing machine for deburring, grinding, honing, finishing and ball burnishing. Various machine accessories are also covered.

82. Heavy Handling Truck

Lull Mfg. Co.—12-page illustrated bulletin No. AD-30A shows various applications of Traveloader which is capable of loading, transporting, unloading and stacking heavy loads and materials of any length from 8 to 66 ft on its double platforms. Shorter loads can be handled on its forks. How it saves space in performing its duties is shown and complete specifications are included.

83. Shielded Arc Welders

Miller Electric Mfg. Co.—Bulletin describes line of transformer type welders for all applications of Heliarc process. Charts, specifications and recommendations for automatic control panels and Heliarc spot welder are included.

84. Tractor-Mounted Crane

Clyde Iron Works, Inc.—4-page illustrated circular MP-43 presents features and specifications of model UC 5-ton capacity and model U 4-ton capacity Handi-Crane. Tractor-mounted unit has 320-degree swing, 17 ft 6 in. turning radius and 12.5 mph maximum speed in 5-speed transmission.

85. Flexible Burring

Lea Mfg. Co.—8-page pamphlet covers Lea method of burring by use of suitable cloth or felt wheels or bobs, coated with suitable grade of compound. Information on standard practice for both ferrous and nonferrous metals and instructions on which wheel and compound to use are included.

86. Drilling Machine

Wales-Strippit Corp.—8-page illustrated catalog DM is descriptive of new Wales drilling machine for precision layout, drilling and reaming of holes. Work up to 36 in. wide and of practically any length can be accommodated. Hole location is accomplished with micrometer accuracy.

87. Pressure Instruments

Hays Corp. — 20-page illustrated bulletin No. 51-667 discusses seven types of indicators, recorders and controllers. Features such as calibrating springs, diaphragm units and differential valve assemblies are explained. Size, scales, ranges and cases of each instrument are depicted as are 14 types of measuring elements.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

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HELPFUL LITERATURE

88. Conveyors & Wire Belts

Korb-Petit Wire Fabrics & Iron Works, Inc.—40-page illustrated catalog No. 31 is devoted to spiral woven wire conveyor belts and complete conveyor systems. Various weaves and materials are available in belts operating where conditions of heat, moisture, corrosion, abrasion, or circulation of air or liquids are factors. Engineering data aids in selection and application of both belts and complete conveyor systems.

89. Coating For Conduits

Republic Steel Corp., Steel and Tubes Div.—Illustrated folder DEK-1 offers engineering data on corrosion resistant polyethylene, a plastic used to coat electrical metallic tubing and conduits. Data includes chemical, electrical, mechanical and thermal properties of this product.

90. Boring & Turning Machines

American Steel Foundries, King Machine Tool Div.—Illustrated catalog K-1 describes and presents specifications of 30, 36 and 42-in. vertical boring and turning machines. Catalog K-2 covers 52, 62 and 72-in. machines; catalog K-3, sizes 84 and 100 in.; and catalog K-4, 120 and 144 in.

91. Power Metal Saws

Peerless Machine Co.—12-page illustrated bulletin, MC-51A, gives sectional photos and descriptions of Mechani-Cut metal saws in capacities of 7 x 7 in., 11 x 11 in. and 14 x 14 in. Specifications of these machines as well as of manual and automatic feed conveyors are presented in tabular form.

92. Export Packaging

Dearborn Chemical Co.—"Preventing Corrosion in Export Packaging" is title of 20-page illustrated manual which explains recommended methods of packaging metal parts for shipment. Packaging steps covered include rust removal, selection of rust preventives, conforming wraps, dip sealing, carton wrapping, case liners and prefabricated bags.

93. Carbide Gage Blocks

Pratt & Whitney, Niles-Bement-Pond Co. Div.—8-page illustrated circular No. 532 gives sizes and tolerances of Hoke and USA carbide gage blocks available in 0.050-in. to 4 in. sizes. Dimensions for six block sets of both Hoke and USA type are listed. Circular also includes description of gage attachments.

94. Springs & Wire Forms

Dudek & Bock Spring & Mfg. Co.—4-page illustrated folder "How To Keep Springing Costs Down" relates how users of coil springs, wire forms or metal stampings can use company's facilities to best advantage. Round wire springs up to from 0.003 to 0.148-in. and square wire up to 0.105-in. can be made, along with wire forms from 0.005 to 0.248-in. and stampings from 0.005 to 0.93-in. up to 3 in. wide.

95. Universal Grinder

Landis Tool Co.—Details of the 30, 36 and 48-in. CHW universal precision grinders developed primarily for grinding of jet turbine rotors and shafts are presented in 4-page illustrated bulletin CI-51. These machines are also adaptable for grinding large diameter work and are available with 48, 72, 96 and 120-in. maximum lengths between centers.

96. Heavy-Duty Coupling

Naylor Pipe Co.—4-page illustrated bulletin No. 513 describes Wedge-Lock type coupling used on temporary or permanent pipe lines. Complete specifications on this one-piece coupling in ranges of light-weight pipe sizes from 8 to 10 in. in diameter are included.

97. Air Conditioners

Westinghouse Electric Corp., Sturtevant Div.—Benefits to be derived through air conditioning in various types of establishments including factories are outlined in 12-page illustrated booklet B-5158. Details of Unitaire air conditioning equipment are included.

98. Floating Tool Holders

Scully-Jones & Co. — 4-page illustrated bulletin 8-50 includes design and application information as well as specifications and prices of JA floating holders which compensate for misalignment between tool and work on reaming, tapping and similar operations at different stations after holes are drilled.

99. Power Screw Driving

Shakeproof Inc. — 12-page illustrated booklet "Here's a Faster Way To Drive Screws" contains detailed drawings which illustrate application, installation and mechanical features of Shakeproof power screw driver. Unit drives up to 60 or more screws per minute. Industrial uses and production and time savings data are presented.

100. Potentiometer Controller

Minneapolis - Honeywell Regulator Co., Brown Instruments Div.—2-page illustrated specification sheet No. 175 presents full description and ordering information for series 153P10 Electronik strip chart potentiometer controller which embodies continuous balance operating principle. General dimensions of controller also given.

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17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100

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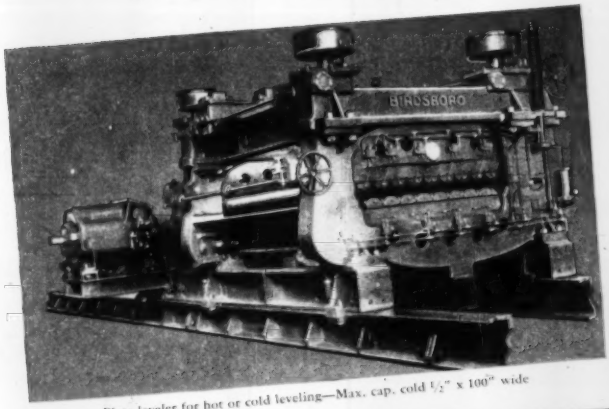
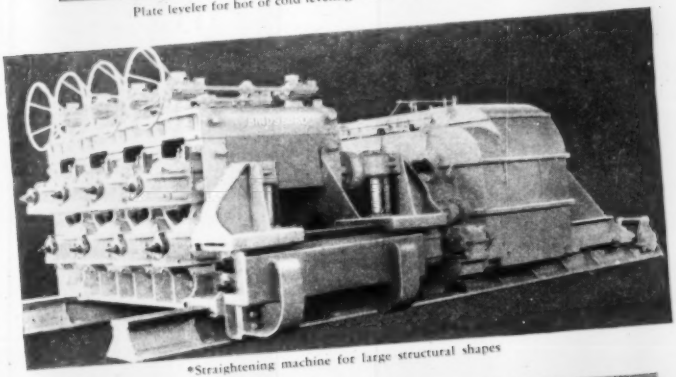


Plate leveler for hot or cold leveling—Max. cap. cold $\frac{1}{2}$" x 100" wide

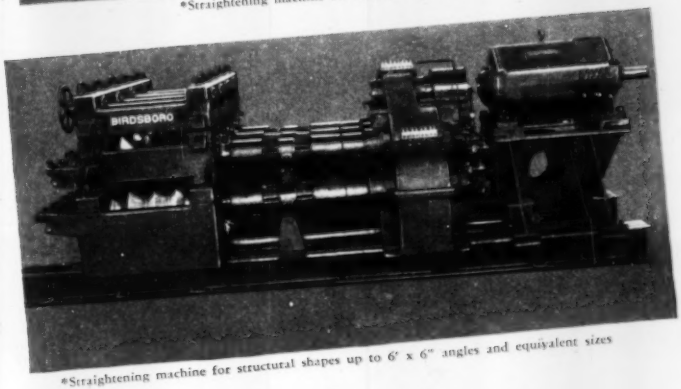
TO SPEED UP *Your Straightening Jobs*

Leveling heavy steel plates, or straightening large structural shapes can be costly and time-consuming, unless the machines you use are efficient. Perhaps one of these Birdsboro straightening machines will meet your requirements. Or perhaps, you will need a specially designed straightening machine to secure maximum results at minimum cost.



*Straightening machine for large structural shapes

Birdsboro design engineers have had diversified experience in designing, straightening and leveling machines. Take advantage of their skill to obtain the equipment you need to do your straightening jobs best.



*Straightening machine for structural shapes up to 6" x 6" angles and equivalent sizes

* Straightening machines are equipped with our "patented" end roll equipment.

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MM-17-51

Old King Cole was a merry old soul,
And a wise old soul was he.
He enjoyed his fiddlers, his pipe and his bowl
Because they were top quality.

When the King called for wire, he got the best,
As a wise buyer always should;
For he knew that Wickwire meets every test —
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Any temper, finish or grade —
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PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corp., Oakland 6, Cal.

The Market Outlook

ROUGH spots are developing in the Controlled Materials Plan as the system for channeling steel, copper and aluminum enters the third week of its shakedown operation. Steel mills are being flooded with orders, backed by CMP allocations, from consumers with whom they have never or rarely done business before. Since there's no priority among CMP orders the mills must accept these orders on a first-come, first-served basis. But the hitch is that many old and valued customers were late in having their applications processed and when they attempt to place their orders with their regular suppliers, the mills' books are filled. These old customers may be forced to search farther afield for their steel. The dislocation is caused by desire on the part of all steel buyers to obtain supplies from nearby mills and save on transportation costs.

SET-ASIDES RAISED—The problem is likely to become more complicated in September. NPA told steel producers to accept CMP orders up to the limit of stated set-aside tonnages and then to give preference to nonrated or "free" orders, such as those from automobile and refrigerator makers, for which no CMP allotments are made. Set-aside tonnages of carbon steel for September are raised sharply with 100 per cent of pipe and oil country goods, rails and tube rounds reserved. All plates are to be distributed by directive. Percentage set-asides for many other products are up sharply. This indicates a rough time for nonrated consumers in obtaining steel, copper and aluminum. Should this situation become as tight as now appears likely, look for a closed end CMP in the fourth quarter. Fourth quarter CMP application forms are being mailed to makers of automobiles and other consumer durable goods manufacturers in anticipation of such a step.

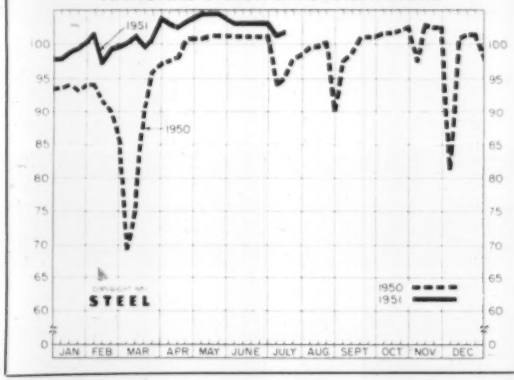
WHAT'S AVAILABLE?—Defense Production Administration estimates 20,825,000 tons of finished steel will be available in the third quarter. Allotments to claimant agencies and NPA industry divisions total slightly more than 16 million tons, or 75 per cent of the estimated supply. Third quarter copper supply is estimated at 1,114 million pounds and allotments are 968 million pounds. Aluminum supply is estimated at 598 million pounds; allotments are 348 million.

SHORTAGES—For many shapes and forms of steel products, requirements during the remainder of the year will be greater than production. Structural steel shape requirements for the fourth quarter are figured at 2,400,000 tons. Production will be about 1,300,000 tons. Plates continue to be extremely tight and will be sold only on directives by the defense agencies. Bar mill capacity also is almost completely sold out with rated tonnage. Cold-rolled sheets, tightest product a few months ago, are relatively easy in supply and some free tonnage will be available in September. Defense demand for cold-rolled sheets is not heavy.

PRODUCTION— A new half-year record for steel ingot production was marked up at the end of June. Total output was 52,273,000, or 5 million tons more than in the first half of 1950. Should production continue at the recent pace, the annual output may reach 106 million tons. Last week was the 19th in which the country's furnaces poured more than 2 million tons. Steelworks operations were 101.5 per cent of rated capacity, a half point gain over the preceding week.

PRICES— Undertone of all iron and steel markets is firm at ceiling levels. STEEL's weighted index on finished steel holds at 171.92 and compares with 156.69 a year ago while the arithmetical price composite holds at $106.32 and compares with $94.36. Pig iron composites last week and for the like week a year ago are: No. 2 foundry, $52.54 and $46.47; basic, $52.16 and $45.97; malleable, $53.27 and $47.27. Steel making scrap price composite is $44 and compares with $36.75 for the like week a year ago.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended July 14	Change	Same Week 1950	Same Week 1949
Pittsburgh	97.5	+ 2*	98.5	67.5
Chicago	106.5	0	101	90
Mid-Atlantic	101	+ 2	96.5	80
Youngstown	105	0	107	75
Wheeling	97	+ 3.5	102.5	85
Cleveland	97.5	+ 3*	63	65
Buffalo	104	0	104	87.5
Birmingham	100	0	100	100
New England	56	- 3½	60	40
Cincinnati	104	- 2	98	96
St. Louis	99.5	0	84.5	75.5
Detroit	100	1*	105	102
Western	101	2.5	95	75
Estimated national rate	101.5	+ 0.5	95	77

Based on weekly steelmaking capacity of 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

*Change from revised rate for preceding week.

The Metalworking Outlook—p. 33 Production-Engineering News—p. 69

Composite Market Averages

	July 12 1951	Week Ago	Month Ago	Year Ago	5 Yrs Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	171.92	171.92	171.92	156.69	112.04
Index in cents per lb.	4.657	4.657	4.657	4.245	3.035
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$106.32	$106.32	$106.32	$94.36	$64.45
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	46.47	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	45.97	27.50
Malleable Pig Iron, GT	53.27	53.27	53.27	47.27	28.79
Steelmaking Scrap, GT	44.00	44.00	44.00	36.75	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	July 12 1951	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R. del. Philadelphia	4.20	4.20	4.20	3.93	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.10-15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.91	3.91	3.91	3.66	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.60	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.60	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.375
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.25-50	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-50	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.35-5.60	4.35-5.60	4.35-5.60	4.35-95	3.15
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.50	3.05
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.50	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, ⅜-⅝", Pitts.	4.10-30	4.10-30	4.10-30	3.85	2.30

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$47.00	$29.00
Basic, Valley	52.00	52.00	52.00	46.00	28.00
Basic, del. Phila.	56.48	56.48	56.49	49.44	29.93
No. 2 Fdry., Pitts.	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry., Chicago	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry., Valley	52.50	52.50	52.50	46.50	28.50
No. 2 Fdry., del. Phila.	56.99	56.99	56.99	49.94	30.43
No. 2 Fdry., Birm.	48.88	48.88	48.88	42.38	24.88
No. 2 Fdry., Birm., del. Cin.	55.33	55.33	55.33	49.08	28.94
Malleable, Valley	52.50	52.50	52.50	46.50	28.50
Malleable, Chicago	52.50	52.50	52.50	46.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	60.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt., Pitts.	$45.00	$45.00	$45.00	$40.00	$20.00
No. 1 Heavy Melt., E. Pa.	43.50	43.50	43.50	33.00	18.75
No. 1 Heavy Melt., Chicago	43.50	43.50	43.50	37.50	18.75
No. 1 Heavy Melt., Valley	45.00	45.00	45.00	40.75	20.00
No. 1 Heavy Melt., Cleve.	44.00	44.00	44.00	38.50	19.50
No. 1 Heavy Melt., Buffalo	44.00	44.00	44.00	38.75	19.25
Rails, Rerolling, Chicago	52.50	52.50	52.50	47.50	22.25
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	44.50	20.00

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	15.50	9.50
Oven, Fdry., Chicago	21.00	21.00	21.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	22.50	14.375
Zinc, E. St. Louis	17.50	17.50	17.50	15.00	8.25-9.50
Lead, St. Louis	16.80	16.80	16.80	11.80	9.35
Tin, New York	106.00	106.00	118.00	80.00	52.00
Aluminum, del.	19.00	19.00	19.00	17.50	15.00
Antimony, Laredo, Tex.	42.00	42.00	42.00	24.50	14.50
Nickel, refinery, duty paid	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	...	58.69	59.46	...
Newark, del.	56.74	57.24	57.74	58.24
Philadelphia, del.	56.49	56.99	57.49	57.99
Birmingham District				
Alabama City, Ala. R2	48.38	48.88		
Birmingham R2	48.38	48.88		
Birmingham S9	48.38	48.88		
Woodward, Ala. W15	48.38	48.88	...	...
Cincinnati, del.	...	55.33	...	...
Buffalo District				
Buffalo R2	52.00	52.50	53.00	...
Buffalo H1	52.00	52.50	53.00	...
Tonawanda, N.Y. W12	52.00	52.50	53.00	...
No. Tonawanda, N.Y. T9	...	52.50	53.00	...
Boston, del.	61.63	62.13	62.63	...
Rochester, N.Y., del.	54.74	55.24	55.74	...
Syracuse, N.Y., del.	55.72	56.22	56.72	...
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
Indiana Harbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill. Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	53.97	54.47	54.47	54.97
Muskegon, Mich., del.	....	58.20	58.20	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, del. from Cleve.	54.49	54.99	54.99	55.49
Lorain, O. N3	52.00	....	....	53.00
Duluth I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	55.25	55.75	....
Fontana, Calif. K1	58.00	58.50	....	....
Geneva, Utah G1	52.00	52.50	....	....
Seattle, Tacoma, Wash., del.	....	60.35	....	....
Portland, Oreg., del.	....	60.35	....	....
Los Angeles, San Francisco, del.	56.85	60.35	....	....
Granite City, Ill. G4	53.50	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah C11	52.00	52.50	....	....
Lone Star, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
Neville Island, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. Sides, Ambridge, Aliquippa, del.	....	53.74	53.74	54.24
McKees Rocks, del.	....	53.49	53.49	53.99
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.00	54.00	54.50
Verona, del.	....	54.48	54.48	54.98
Brackenridge, del.	....	54.72	54.72	55.22
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.21	57.71	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.43	56.93	56.93	57.43

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50%, no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.00-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, OH & Fdry. 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 x 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, Intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia, delivered	63.12
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, July 12, 1951; cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 .....52.00

INGOTS, Alloy (NT)
Detroit R7 .....$54.00
Fontana,Calif. K1 ....80.00
Houston,Tex. S5 .....62.00
Midland,Pa. C18 .....54.00
Munhall,Pa. U5 .....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 .....56.00
Ensley,Ala. T2 .....56.00
Fairfield,Ala. T2 .....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 .....56.00
Johnstown,Pa. B2 .....56.00
Lackawanna,N.Y. B2..56.00
Munhall,Pa. U5 .....56.00
So.Chicago,Ill. U5 .....56.00
So.Duquesne,Pa. U5 ...56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$66.00
Buffalo R2 .....66.00
Canton,O. R2 .....66.00
Clairton,Pa. U5 .....66.00
Cleveland R2 .....66.00
Conshohocken,Pa. A3 ..73.00
Detroit R7 .....69.00
Ensley,Ala. T2 .....66.00
Fairfield,Ala. T2 .....66.00
Fontana,Calif. K1 ....66.00
Gary,Ind. U5 .....66.00
Geneva,Utah G1 .....66.00
Houston,Tex. S5 .....74.00
Johnstown,Pa. B2 .....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....66.00
Seattle B3 .....85.00
So.Chicago R2,U5,W14 ..66.00
So.Duquesne,Pa. U5 ...66.00
So.SanFrancisco B3 ...85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 .....70.00
Canton,O. R2 .....70.00
Canton,O. (2)9) T7 ....66.00
Conshohocken,Pa. A3 ..77.00
Detroit R7 .....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 .....70.00
Houston,Tex. S5 .....78.00
Ind.Harbor,Ind. Y1 .....70.00
Johnstown,Pa. B2 .....70.00
Lackawanna,N.Y. B2 ..70.00
LosAngeles B3 .....90.00
Massillon,O. R2 .....70.00
Midland,Pa. C18 .....70.00
Munhall,Pa. U5 .....70.00
So.Chicago R2,U5,W14 ..70.00
So.Duquesne,Pa. U5 ...70.00
Struthers,O. Y1 .....70.00
Warren,O. C17 .....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$82.00
Cleveland R2 .....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 .....82.00
Massillon,O. R2 .....82.00
So.Chicago,Ill. R2 .....82.00
So.Duquesne,Pa. U5 ...82.00

SHEET BARS (NT)
Fontana,Calif. K1 ....$89.00

SKELP
Aliquippa,Pa. J5 .....3.45
Munhall,Pa. U5 .....3.35
Warren,O. R2 .....3.35
Youngstown R2, U5 .....3.35

WIRE RODS
AlabamaCity,Ala. R2 ...4.10
Buffalo W12 .....4.10
Cleveland A7 .....4.10
Donora,Pa. A7 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 .....4.90
Houston,Tex. S5 .....4.50
Johnstown,Pa. B2 .....4.10
Joliet,Ill. A7 .....4.10
LosAngeles B3 .....5.00
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 .....4.30
No.Tonawanda,N.Y.B11 ..4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 .....4.30
Roebling, N. J. R5 .....4.20
So.Chicago,Ill. R2 .....4.10
SparrowsPoint,Md. B2 ..4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 .....4.10
Torrance,Calif. C11 .....4.90
Worcester A7 .....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 .....4.45
So.Chicago,Ill. U5 .....4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ...3.60
Aliquippa,Pa. J5 .....3.65
Bessemer,Ala. T2 .....3.65
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fairfield,Ala. T2 .....3.65
Fontana,Calif. K1 .....4.25
Gary,Ind. U5 .....3.65
Geneva,Utah G1 .....3.65
Houston,Tex. S5 .....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.25
Lackawanna,N.Y. B2 ...3.70
LosAngeles B3 .....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 .....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....4.95
Portland,Oreg. O4 .....4.50
Seattle B3 .....4.30
So.Chicago,Ill. U5, W14 3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 .....4.25
Weirton,W.Va. W6 .....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 .....4.35
Fontana,Calif. K1 .....5.55
Munhall,Pa. U5 .....4.35
So.Chicago, Ill. U5.....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....5.50
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa.(14) B2..5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.10
Gary,Ind. U5 .....5.50
Geneva,Utah G1 .....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y1 .....6.00
Johnstown,Pa. B2 .....5.50
Lackawanna,N.Y.(14)B2 5.50
LosAngeles B3 .....6.05
Munhall,Pa. U5 .....5.50
Seattle B3 .....6.10
So.Chicago,Ill. U5 .....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 .....6.00

Wide Flange
Bethlehem,Pa. B2 .....3.70
Clairton,Pa. U5 .....3.65
Fontana,Calif. K1 .....4.65
Lackawanna,N.Y. B2 ...3.70
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....5.50
Lackawanna,N.Y. B2 ...5.50
Munhall,Pa. U5 .....5.45
So.Chicago,Ill. U5 .....5.45

BEARING PILES
Munhall,Pa. U5 .....3.65
So.Chicago,Ill. U5 .....3.65

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.65
Bessemer,Ala. T2 .....5.65
Clairton,Pa. U5 .....5.65
Cleveland J5, R2 .....5.65
Conshohocken,Pa. A3 ...5.90
Fairfield,Ala. T2 .....5.65
Fontana,Calif.(30) K1 ..6.25
Gary,Ind. U5 .....5.65
Geneva,Utah G1 .....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 .....6.15
Johnstown,Pa. B2 .....5.65
Munhall,Pa. U5 .....5.65
Pittsburgh J5 .....5.65
Seattle B3 .....6.55
Sharon,Pa. S3 .....5.70
So.Chicago,Ill. U5 .....5.65
SparrowsPoint,Md. B2 ...5.65
Warren,O. R2 .....5.65
Youngstown Y1 .....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 .....4.85
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ....5.05
Fontana,Calif. K1 .....5.70
Gary,Ind. U5 .....4.75
Johnstown,Pa. B2 .....4.75
Munhall,Pa. U5 .....4.75
Sharon,Pa. S3 .....5.20
So.Chicago,Ill. U5 .....4.75
SparrowsPoint,Md. B2 ...4.75

FLOOR PLATES
Cleveland J5 .....4.75
Conshohocken,Pa. A3 ....4.75
Harrisburg,Pa. C5 .....5.90
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 .....4.75
So.Chicago,Ill. U5 .....4.75

PLATES, Ingot Iron
Ashland,(c)(15) A10 ....3.95
Ashland,(c)(15) A10 .....4.45
Cleveland,(c) R2 .....4.30
Warren,O.(c) R2 .....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...3.70
Aliquippa,Pa. J5 .....3.70
Ashland,Ky.(15) A10 ....3.70
Bessemer,Ala. T2 .....3.70
Clairton,Pa. U5 .....3.70
Claymont,Del. C22 .....4.15
Cleveland J5, R2 .....3.70
Coatesville,Pa. L7 .....4.15
Conshohocken,Pa. A3 ....4.15
Fairfield, Ala. T2 .....3.70
Fontana,Calif.(30) K1 ..4.30
Gary,Ind. U5 .....3.70
GraniteCity,Ill. G4 .....4.40
Geneva,Utah G1 .....3.70
Harrisburg,Pa. C5 .....4.95
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ....3.70
Minnequa,Colo. C10 .....4.50
Munhall,Pa. U5 .....3.70
Pittsburgh J5 .....3.70
Seattle B3 .....4.60
Sharon,Pa. S3 .....3.95
So.Chicago,Ill. U5, W14 3.70
SparrowsPoint,Md. B2 ...3.70
Steubenville,O. W10 .....3.70
Warren,O.R2 .....3.70
Weirton,W.Va. W6 .....4.00
Youngstown R2, U5, Y1 3.70

PLATES, Carbon A. R.
Fontana,Calif. K1 .....5.45
Geneva,Utah G1 .....4.85

PLATES, Wrought Iron
Economy,Pa. B14 .....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ...3.70
Aliquippa,Pa. J5 .....3.70
Alton,Ill.(1) L1 .....3.90
Atlanta,Ga. A11 .....4.25
Bessemer,Ala. T2 .....3.70
Buffalo R2 .....3.70
Canton,O. R2 .....3.70
Clairton,Pa. U5 .....3.70
Cleveland R2 .....3.70
Detroit R7 .....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 .....3.70
KansasCity,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 .....4.40
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 .....4.15
Niles,Calif. P1 .....5.05
N.Tonawanda,N.Y. B11 3.70
Pittsburg,Calif. C11 .....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
So.Chicago R2, U5, W14 3.70
So.Duquesne,Pa. U5 .....3.70
So.SanFran.,Csl. B3 .....4.45
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 .....4.40
Weirton,W.Va. W6 .....3.85
Youngstown R2, U5 .....3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....3.70
Atlanta A11 .....4.25
Bessemer,Pa. B2 .....3.70
Lackawanna,N.Y. B2 ....3.70
Niles,Calif. P1 .....5.05
Portland,Oreg. O4 .....4.65
SanFrancisco S7 .....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 .....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.30
Canton,O.(29) T7 .....3.95
Clairton,Pa. U5 .....4.30
Detroit R7 .....4.45
Ecorse,Mich. G5 .....4.65
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.30
Houston,Tex. S5 .....4.50
Ind.Harbor,Ind. I-2, Y1 4.30
Johnstown,Pa. B2 .....4.30
Kansas City, Mo. S5 .....4.90
Lackawanna,N.Y. B2 ....4.30
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.30
Midland,Pa. C18 .....4.30
So.Chicago R2,U5,W14 ..4.30
S.Duquesne,Pa. U5 .....4.30
Struthers,O. Y1 .....4.30
Warren,O. C17 .....4.30
Youngstown U5 .....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....4.55
Gary,Ind. U5 .....4.55
Youngstown U5 .....4.55

BARS & SMALL SHAPES, H. R., High-Strength Low-Alloy
Aliquippa,Pa. J5 .....5.55
Bessemer,Ala. T2 .....5.55
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.55
Cleveland R2 .....5.55
Fairfield,Ala. T2 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Ind.Harbor,Ind. I-2 .....5.55
IndianaHarbor,Ind. Y1..6.05
Johnstown,Pa. B2 .....5.55
Lackawanna, N. Y. B2..5.55
LosAngeles B3 .....6.25
Pittsburgh J5 .....5.55
Seattle B3 .....6.30
So.Duquesne,Pa. U5 .....5.55
So.SanFrancisco B3 .....6.30
Struthers,O. Y1 .....6.05
Youngstown U5 .....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....4.55
BeaverFalls,Pa. M12,R2..4.55
Buffalo B5 .....4.60
Camden,N.J. P13 .....5.00
Carnegie,Pa. C12 .....4.55
Chicago W18 .....4.55
Cleveland A7, C20 .....4.55
Detroit P17 .....4.70
Donora,Pa. A7 .....4.55
Elyria,O. W8 .....4.55
FranklinPark,Ill. N5 .....4.55
Gary,Ind. R2 .....4.55
GreenBay,Wis. F7 .....4.55
Hammond,Ind. I-2, M13 4.55
Hartford,Conn. R2 .....5.10
Harvey,Ill. B5 .....4.55
LosAngeles R2 .....6.00
Mansfield,Mass. B5 .....5.10
Massillon,O. R2, R8 .....4.55
Monaca,Pa. S17 .....4.55
Newark,N.J. W18 .....5.00
Plymouth,Mich. P5 .....4.60
Pittsburgh J5 .....4.55
Putnam,Conn. W18 .....5.10
Readville,Mass. C14 .....5.10
St.Louis,Mo. M5 .....4.95
So.Chicago,Ill. W14 .....4.55
SpringCity,Pa.(5) K3 ....5.00
Struthers,O. Y1 .....4.55
Waukegan,Ill. A7 .....4.55
Youngstown F3, Y1 .....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....5.40
BeaverFalls,Pa. M12 .....5.40
Bethlehem,Pa. B2 .....5.40
Buffalo B5 .....5.40
Camden,N.J. P13 .....5.80
Canton,O. R2 .....5.40
Canton,O.(29) T7 .....4.90
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7 .....5.45
Cleveland C20 .....5.40
Detroit P17 .....5.55
Donora,Pa. A7 .....5.45
Elyria,O. W8 .....5.40
Gary,Ind. R2 .....5.40
Hammond,Ind. I-2, M13 5.40
Hartford,Conn. R2 .....5.85
Harvey,Ill. B5 .....5.40
Lackawanna,N.Y. B2 .....5.40
Mansfield,Mass. B5 .....5.85
Massillon,O. R2, R8 .....5.40
Midland,Pa. C18 .....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.75
Plymouth,Mich. P5 .....5.60
So.Chicago,Ill. R2, W14 5.40
Struthers,O. Y1 .....5.40
Warren,O. C17 .....5.40
Waukegan,Ill. A7 .....5.45
Worcester,Mass. A7 .....5.75
Youngstown F3, Y1 .....5.40

RAIL STEEL BARS
Chicagolifts,(3,4) C2 ....4.75
Chicagolifts,(3,4) I-2 ....4.50
Franklin,Pa.(3,4) F5 .....4.75
FortWorth,Tex.(26) T4 ..4.85
Huntngtn,W.Va.(3) W7 ..5.50
Marion,O.(3) P11 .....4.75
Moline,Ill.(3) R2 .....3.80
Tonawanda (3,4) B12 .....4.75
Williamsport(3,4) S19 ....5.00
Williamsport(4) S19 .....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 15.00
Dover,(Eng.Bolt) U1 .....13.50
Dover(Wrgt.Iron) U1 .....12.25
Economy,Pa.(S.R.) B14 ..9.60
Economy,Pa.(D.R.)B14 11.90
Economy (Staybolt)B14 12.20
McK Rks.(Staybolt) L5 14.50
McK Rks.(S.R.) L5 .....9.60
McKRks.(D.R.) L5.....13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 .....3.70
Alton,Ill.(6) L1 .....3.70
Atlanta A11 .....4.25
Buffalo R2 .....3.70
Cleveland R2 .....3.70
Emeryville,Calif. J7 .....4.45
Fairfield,Ala. T2 .....3.70
Fontana,Calif. K1 .....4.40
Gary,Ind. U5 .....3.70
Houston,Tex. S5 .....4.10
Ind.Harbor,Ind. I-2, Y1 3.70
Johnstown,Pa. B2 .....3.70
Kansas City,Mo. S5 .....4.30
Lackawanna,N.Y. B2 ....3.70
Milton,Pa. B6 .....4.20
Minnequa,Colo. C10 .....4.15
Niles,Calif. P1 .....5.05
No.Tonawanda,N.Y. B11 3.70
Pittsburg,Calif. C11 .....4.40
Pittsburgh J5 .....3.70
Portland,Oreg. O4 .....4.65
Seattle B3, N14 .....4.45
Sharon,Pa. S3 .....3.70
So.Chicago,Ill. U5 .....3.70
So.SanFrancisco B3 .....4.45
SparrowsPoint,Md. B2 ...3.70
Struthers,O. Y1 .....3.70
Torrance,Calif. C11 .....4.40
Youngstown R2, U5 .....3.70

BARS, Reinforcing
(Fabricated to Consumers)
Huntington,W.Va. W7 ....5.50
Johnstown, ¼-1" B2 .....4.75
LosAngeles B3 .....5.45
Marion,O. P11 .....5.00
Seattle B3, N14 .....5.55
So.SanFrancisco B3 .....5.45
SparrowsPt, ¼-1" B2 ....4.75
Williamsport,Pa. S19 .....5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ....3.60
Ashland,Ky.(8) A10 .....3.60
Butler,Pa. A10 .....3.60
Cleveland J5, R2 .....3.60
Conshohocken,Pa. A3 .....4.00
Detroit M1 .....4.40
Ecorse,Mich.(8) G5 .....3.80
Fairfield,Ala. T2 .....3.60
Fontana,Calif. K1 .....4.55
Gary,Ind. U5 .....3.60
Geneva,Utah G1 .....3.70
GraniteCity,Ill. G4 .....4.30
Ind.Harbor,Ind., I-2,Y1 .3.60
Irwin,Pa. U5 .....3.60
Lackawanna,N.Y. B2 .....3.60
Munhall,Pa. U5 .....3.60
Niles,O. N12 .....5.25
Pittsburg,Calif. C11 .....4.30
Pittsburgh J5 .....3.60
Sharon,Pa. S3 .....3.60
So.Chicago,Ill. W14 .....3.60
SparrowsPoint,Md. B2 .....3.60
Steubenville,O. W10 .....3.60
Torrance,Calif. C11 .....4.30
Warren,O. R2 .....3.60
Weirton,W.Va. W6 .....3.60
Westleechburg,Pa. A4..3.75
Youngstown U5, Y1 .....3.60

SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 .....4.75
Dover,O. E6 .....5.65
Ind.Harbor,Ind. I-2 .....5.40
Mansfield,O. E6 .....5.65
Niles,O. N12 .....5.75
Torrance,Calif. C11 .....5.40

SHEETS, H.R. (14-ga., heavier)
High-Strength Low-Alloy
Cleveland J5, R2 .....5.40
Conshohocken,Pa. A3 .....5.65
Ecorse,Mich. G5 .....5.95
Fairfield,Ala. T2 .....5.40
Fontana,Calif. K1 .....6.35
Gary,Ind. U5 .....5.40
Ind.Harbor,Ind. I-2 .....5.40
IndianaHarbor,Ind. Y1..5.90
Irvin,Pa. U5 .....5.40
Lackawanna(35) B2 .....5.40
Pittsburgh J5 .....5.40
Sharon,Pa. S3 .....5.40
So.Chicago,Ill. U5 .....5.40
SparrowsPoint(36) B2 .....5.40
Warren,O. R2 .....5.40
Weirton,W.Va. W6 .....5.75
Youngstown U5 .....5.40
Youngstown Y1 .....5.90

SHEETS, Cold-Rolled
High-Strength Low-Alloy
Cleveland J5, R2 .....6.55
Ecorse,Mich. G5 .....7.10
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.55
IndianaHarbor,Ind. Y1 ..7.05
IndianaHarbor,Ind. I-2 ..6.55
Irvin,Pa. U5 .....6.55
Lackawanna(37) B2 .....6.55
Pittsburgh J5 .....6.55
SparrowsPoint(38) B2 ...6.55
Warren,O. R2 .....6.55
Weirton,W.Va. W6 .....6.90
Youngstown Y1 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.50
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va.-W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

Alabama City,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 Ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

ROOFING SHORT TERNES (8 lb. coated)

Gary,Ind. U5	9.60

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

SHEETS, Enameling Iron

Ashland,Ky. (8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

SHEETS, Culvert No. 16 Pure Iron

	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.60	5.60
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	6.70
MartinsFerry,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	
SparrowsPt. B2	5.60	
Torrance,Cal. C11	6.35	

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.75
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, American 1.25 Coke (Base Box)

	1.50 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Calif. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren R2	8.45	8.70
Weirton W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. B2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. B2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

STRIP, Hot-Rolled Alloy

Bridgprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	5.45
Sharon,Pa. S8	5.85
Youngstown U5	5.50

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill.(4) L1	3.75
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.00
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(22) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
West Leechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBritn,Conn.(10) S15	10.75
Pawtucket,R.I.(11) NS	10.75
Pawtucket,R.I.(12) NS	11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.30
Youngstown C8	10.60

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) NS	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O. T5	4.65
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7		6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1			7.70	9.65	
Carnegie,Pa. S18		6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65		
Detroit D2	5.60	6.65	7.25		
Dover,O. G6	5.60	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18			7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35		
NewYork W3		7.10	7.70	9.65	11.95
Pawtucket,R.I. NS: Cleve.-or-Pitts.Base		6.80	7.40	9.35	11.65
Worcester,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5		7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8		6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton,N.J. R5		10.30	12.50	15.35
Harrison,N.J. C18		10.30	12.50	15.35
NewYork W3		10.30	12.50	15.35

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R (22 Ga.) COILS (Cut Lengths 1/2c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10 (cut lengths)			7.25	8.50	9.00
Brackenridge,Pa. A4			7.75	9.00	9.50
GraniteCity,Ill. G4 (cut lengths)			7.95	9.20	
Ind.Harbor,Ind. I-2	6.95	7.25	(34)		
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.50
Niles,O. N12 (cut lengths)		7.75	7.25		
Vandergrift,Pa. U5		7.25	7.75	9.00	9.50
Warren,O. R2	6.95	7.25	7.75	9.00	9.50
Zanesville,O. A10		7.25	7.75	9.00	9.50

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1/2c lower) Transformer Grade

	72	65	58	52
BeechBottom,W.Va. W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35			
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35			
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	11.90	13.25	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bonardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div.
Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Frets-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Josyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8) A10 .. 3.75
Warren,O. R2 ..... 4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 ..... 5.25

TIGHT COOPERAGE HOOP

Atlanta A11 ..... 4.05
Riverdale,Ill. A1 ..... 3.90
Sharon,Pa. S3 ..... 4.15
Youngstown U5 ..... 3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(19) K4	5.70	6.15
Buffalo W12	4.85	
Cleveland A7	5.70	6.15
Crawfordsville MS	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	
Minnequa C10	5.95	6.45
Monessen P7	5.95	6.40
Palmer W12	5.15	
Pitts,Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	
Worcester A7	6.00	6.45

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1) K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsvlle MS	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass.W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

ROPE WIRE	(A)	(B)
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass. W12	8.55[2]	
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ... 4.85
Aliquippa,Pa. J5 ..... 4.85
Atlanta A11 ..... 5.10
Alton,Ill.(1) L1 ..... 4.85
Bartonville,Ill.(1) K4 .. 4.85
Buffalo W12 ..... 4.85
Chicago W13 ..... 5.10
Cleveland A7, C20 .... 4.85
Crawfordsville,Ind. MS.. 5.10
Donora,Pa. A7 ..... 4.85
Duluth,Pa. A7 ..... 4.85
Fairfield,Ala. T2 ..... 4.85
Fostoria,O.(24) S1 ..... 5.25
Houston S5 ..... 5.25
Johnstown,Pa. B2 ..... 4.85
Joliet,Ill. A7 ..... 4.85
KansasCity,Mo. S5 ..... 5.45
Kokomo,Ind. C16 ..... 4.95
LosAngeles B3 ..... 5.80
Minnequa,Colo. C10 ... 5.10
Monessen,Pa. P7 ..... 5.10
Newark, 6-8 ga. I-1 ..... 5.50
No.Tonawanda B11 ..... 4.85
Palmer,Mass. W12 ..... 5.15
Pittsburg,Calif. C11 ..... 5.80
Portsmouth,O. P12 ..... 5.25
Rankin,Pa. A7 ..... 4.85
So.Chicago,Ill. R2 ..... 4.85
So.SanFrancisco C10 ... 5.80
SparrowsPoint,Md. B2 ... 4.90
Sterling,Ill.(1) N15 ..... 4.85
Struthers,O. Y1 ..... 4.85
Torrance,Calif. C11 ..... 5.80
Waukegan,Ill. A7 ..... 4.85
Worcester,Mass. A7, T6.. 5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6 ..... 6.20
Buffalo W12 ..... 6.35
Cleveland A7 ..... 5.85
Crawfordsville,Ind. MS.. 6.20
Detroit D2 ..... 6.20
Dover,O. G6 ..... 6.20
Fostoria,O. S1 ..... 6.00
Kokomo,Ind. C16 ..... 5.70
FranklinPark,Ill. T6 .. 6.20
Massillon,O. R8 ..... 5.85
Monessen,Pa. P16 ..... 5.85
Monessen,Pa. P7 ..... 6.10
NewHaven,Conn. D2 ..... 6.50
Pawtucket,R.I.(12) N8.. 6.85
Trenton,N.J. R5 ..... 6.15
Worcester A7 ..... 6.15
Worcester T6 ..... 6.50
Worcester W12 ..... 6.65

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1) K4 .. 8.90
Buffalo W12 ..... 8.90
Chicago W13 ..... 8.90
Cleveland A7 ..... 8.90
Crawfordsville,Ind. MS.. 8.95
Fostoria,O. S1 ..... 8.90
Johnstown,Pa. B2 ..... 8.90
Kokomo,Ind. C16 ..... 8.90
Monessen,Pa. P16 ..... 8.90
Palmer,Mass. W12 ..... 9.20
Portsmouth,O. P12 ..... 8.90
Roebling,N.J. R5 ..... 9.20
Waukegan,Ill. A7 ..... 8.90
Worcester,Mass. A7, T6 9.20

WIRE, Galv'd ACSR For Cores

Bartonville,Ill. K4 ..... 8.50
Monessen,Pa. P16 ..... 8.50
Roebling,N.J. R5 ..... 8.80
SparrowsPoint,Md. B2 .. 8.60
Johnstown,Pa. B2 ..... 8.50

WIRE, Tire Bead

Bartonville,Ill.(1) K4 .. 10.90
Monessen,Pa. P16 ..... 11.40
Roebling,N.J. R5 ..... 11.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 ..... 6.25
Alton,Ill.(1) L1 ..... 6.25
Bartonville,Ill.(1) K4 .. 6.25
Buffalo W12 ..... 6.25
Cleveland A7 ..... 6.25
Donora,Pa. A7 ..... 6.25
Duluth A7 ..... 6.25
Fostoria,O. S1 ..... 6.25
Johnstown,Pa. B2 ..... 6.25
LosAngeles B3 ..... 7.20
Milbury,Mass.(12) N6 .. 8.05
Monessen,Pa. P7, P16.. 6.25
Palmer,Mass. W12 ..... 6.55
Pittsburg,Calif. C11 ..... 7.20
Roebling,N.J. R5 ..... 6.55
Portsmouth,O. P12 ..... 6.25
So.Chicago,Ill. R2 ..... 6.25
So.SanFrancisco C10 ... 7.20
SparrowsPoint,Md. B2 .. 6.35
Struthers,O. Y1 ..... 6.25
Trenton,N.J. A7 ..... 6.55
Waukegan,Ill. A7 ..... 6.25
Worcester A7, T6, W12.. 6.55
Worcester,Mass. J4 .... 6.75

WIRE, Upholstery Spring

Aliquippa,Pa. J5 ..... 5.90
Alton,Ill.(1) L1 ..... 5.90
Buffalo W12 ..... 5.90
Cleveland A7 ..... 5.90
Donora,Pa. A7 ..... 5.90
Duluth A7 ..... 5.90
Johnstown,Pa. B2 ..... 5.90
LosAngeles B3 ..... 6.85
Monessen,Pa. P7, P16 .. 5.90
NewHaven,Conn. A7 .... 6.20
Palmer,Mass. W12 ..... 6.20
Pittsburg,Calif. C11 ..... 6.85
Portsmouth,O. P12 ..... 5.90
Roebling,N.J. R5 ..... 6.20
So.Chicago,Ill. R2 ..... 5.90
So.SanFrancisco C10 ... 6.85
SparrowsPoint,Md. B2 .. 6.00
Torrance,Calif. C11 ..... 6.85
Trenton,N.J. A7 ..... 6.20
Waukegan,Ill. A7 ..... 5.90
Worcester,Mass. A7 .... 6.20

WOVEN FENCE, 9-1½ Ga. Col.

AlabamaCity,Ala. R2 ... 126
Ala.City,Ala.,17-18ga.R2 213
Aliquippa,Pa.9-14ga.J5 130
Atlanta A11 133
Bartonville,Ill.(19) K4 .. 130
Crawfordsville,Ind. MS .. 132
Donora,Pa. A7 130
Duluth A7 130
Fairfield,Ala. T2 130
Houston,Tex. S5 138
Johnstown,Pa. B2 130
Johnstown,17ga.,6" B2 .. 204
Johnstown,17ga.,4" B2 .. 207
Joliet,Ill. A7 130
KansasCity,Mo. S5 142
Kokomo,Ind. C16 132
Minnequa,Colo. C10 138
Monessen,Pa. P7 135
Pittsburg,Calif. C11 153
Portsmouth,O.(18) P12 .. 137
Rankin,Pa. A7 130
So.Chicago,Ill. R2 126
Sterling,Ill.(1) N15 130

FENCE POSTS

ChicagoHts.,Ill. C2 140
Duluth A7 125
Franklin,Pa. F5 140
Huntington,W.Va. W7 ... 140
Johnstown,Pa. B2 140
Marion,O. P11 140
Minnequa,Colo. C10 130
Moline,Ill. R2 136
So.Chicago R2 140
Tonawanda B12 140
Williamsport,Pa. S19 ... 150

WIRE, Barbed	Col.
AlabamaCity,Ala. R2 ...	136
Aliquippa,Pa. J5	140
Atlanta A11	143
Bartonville,Ill.(19) K4 ..	143
Crawfordsville MS	145
Donora,Pa. A7	140
Duluth,Minn. A7	140
Fairfield,Ala. T2	140
Houston,Tex. S5	148
Johnstown,Pa. B2	140
Joliet,Ill. A7	140
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	146
Monessen,Pa. P7	145
Pittsburg,Calif. C11	160
Portsmouth,O.(15) P12 ..	147
Rankin,Pa. A7	140
So.Chicago,Ill. R2	136
So.SanFran.,Calif. C10 ..	160
SparrowsPoint,Md. B2 ..	142
Sterling,Ill.(1) N15	140

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2 ...	123
Atlanta A11	126
Bartonville,Ill.(19) K4 ..	123
Crawfordsville MS	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	133
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10 ..	147
SparrowsPoint,Md. B2 ..	125
Sterling,Ill.(1) N15	123

NAILS & STAPLES, Non-Stock	
AlabamaCity,Ala. R2 ...	6.10
Bartonville,Ill.(19) K4 ..	5.95
Crawfordsville,Ind. MS ..	6.30
Donora,Pa. A7	5.95
Duluth,Minn. A7	5.95
Johnstown,Pa. B2	5.95
Joliet,Ill. A7	5.95
Kokomo,Ind. C16	6.05
Minnequa,Colo. C10	6.20
Pittsburg,Calif. C11	6.90
Portsmouth,O. P12	6.25
Rankin,Pa. A7	5.95
So.Chicago,Ill. R2	6.10
SparrowsPoint,Md. B2 ..	6.05
Sterling,Ill.(1) N15	5.65
Worcester,Mass. A7	6.25

NAILS, Cut (100 lb keg) To dealers (33)	
Conshohocken,Pa. A3 ..	$7.35
Wheeling,W.Va. W10 ...	7.35

NAILS & STAPLES, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2 ...	118
Aliquippa,Pa. (13) J5 ..	118
Atlanta A11	121
Bartonville,Ill.(19) K4 ..	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. MS ..	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	126
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
KansasCity,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2 ..	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1.. 6.15
KansasCity,Mo. S5 ..... 6.40
Lebanon,Pa. B2 ..... 6.15
Minnequa,Colo. C10 .... 6.15
Pittsburgh J5 ..... 6.15
Seattle B3 ..... 6.65
So.Chicago,Ill. R2 ..... 6.15
Struthers,O. Y1 ..... 6.15
Youngstown R2 ..... 6.15

TRACK BOLTS (20) Treated

KansasCity,Mo. S5 ..... 9.85
Lebanon,Pa.(32) B2 ... 9.85
Minnequa,Colo. C10 .... 9.85
Pittsburgh O3, P14 .... 9.85
Seattle B3 ..... 10.35

TIE PLATES

Fairfield,Ala. T2 ..... 4.50
Gary,Ind. U5 ..... 4.50
Ind.Harbor,Ind. I-2 .... 4.50
Lackawanna,N.Y. B2 .... 4.50
Minnequa,Colo. C10 .... 4.50
Pittsburg,Calif. C11 .... 4.65
Seattle B3 ..... 4.65
Steelton,Pa. B2 ..... 4.50
Torrance,Calif. C11 .... 4.65

JOINT BARS

Bessemer,Pa. U5 ..... 4.70
Fairfield,Ala. T2 ..... 4.70
Ind.Harbor,Ind. I-2 .... 4.70
Joliet,Ill. U5 ..... 4.70
Lackawanna,N.Y. B2 .... 4.70
Minnequa,Colo. C10 .... 4.70
Steelton,Pa. B2 ..... 4.70

AXLES

Ind.Harbor,Ind. S18 .... 5.60
Johnstown,Pa. B2 ..... 5.60

RAILS	Std. No. 1	Std. No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50	...	4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	...(16)14.00	
Lackawanna B2	3.60	3.50	...	4.00
Minnequa,Colo. C10	3.60	3.50	...	4.50
Steelton,Pa. B2	3.60	3.50	...	...
Williamsport,Pa. S19	...	...	...	4.75

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield, S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	23.00	13.5W,4Cr,3V	140.00
Extra Carbon	27.00	18W,4Cr,2V,9Co	217.50
Spec. Carbon	32.50	19W,4Cr,2V,7Co	217.50
Oil Hardening	35.00	18.25W,4.25Cr,1V,4.75Co	185.50
Cr. Hot Wrk	35.00	20.25W,4.25Cr,1.6V,12.25Co	323.00
Hi-Carbon-Cr	63.50	1.5W,4Cr,1V,8.5Mo	78.50
18W,4Cr,1V	123.50	6.4W,4.5Cr,1.9V,5Mo	87.00
18W,4Cr,2V	138.00	6W,4Cr,3V,6Mo	109.50

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill basis.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.00c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Pittsburgh base; add 0.35c for universal mill.
(31) Not annealed.
(32) Hex. edge or square edge.
(33) To jobbers, deduct 20 cents.
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

GRAY IRON Characteristics Include . . .

- CASTABILITY
- Rigidity
- Low Notch Sensitivity
- Wear Resistance
- Heat Resistance
- Corrosion Resistance
- Durability
- Vibration Absorption
- Machinability
- Wide Strength Range

The air-cooled cylinders and engine bases shown above involve precise and intricate design—including a number of wafer-thin cooling "fins".

Production of such parts to accurate dimensions—in quantities of 100 or 1,000—is most economical when Gray Iron is used. No intricate or expensive "joining problems" are involved, as would be required with fabricated or assembled parts.

To this advantage of castability in intricate shapes, add Gray Iron's outstanding wear-resistant, corrosion-resistant and heat-resistant properties . . . and you have the perfect material for these and similar precision parts.

Be sure to investigate Gray Iron's unmatched combination of advantages for *your* product.

MAKE IT BETTER WITH GRAY IRON

Second largest industry in the Metal-working field

FOUNDRIES NEED SCRAP—KEEP IT MOVING!

GRAY IRON FOUNDERS' SOCIETY, INC.

NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.6c	0.24	34.0	32.0	29.0	1.5	+0.5	+3.5
¼	6.0	0.42	28.5	26.5	23.5	+1.0	+3.0	+6.0
⅜	6.0	0.57	23.5	21.5	18.5	+7.0	+9.0	+12.0
½	8.5	0.85	36.0	34.0	35.0	14.0	12.0	13.0
¾	11.5	1.18	39.0	37.0	38.0	18.0	16.0	17.0
1	17.0	1.68	41.5	39.5	40.5	21.5	19.5	20.5
1¼	23.0	2.28	42.0	44.0	41.0	22.0	24.0	21.0
1½	27.5	2.78	42.5	41.5	41.5	23.0	21.5	22.0
2	37	3.68	43.0	41.0	42.0	23.5	21.5	22.5
2½	58.5	5.82	43.5	41.5	42.5	24.0	22.0	23.0
3	76.5	7.62	43.5	41.5	42.5	24.0	22.0	23.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ½", 2 points lower on ¼" and ⅜". Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11½ points lower on ⅛" and larger continuous weld and 24% on 3½" and 4". Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y1; Alton, Ill. (Gary base) L1.

Column D: Butler, Pa. F6, ¼-⅜"; Benwood, W. Va. W10, except plus 3½% on ⅛", plus 2½% on ¼", plus 9% on ⅜"; Sharon, Pa. M6, plus 0.5 on ⅛", 1 point lower on ½", ⅝", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 16¼% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ⅜", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 18½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	9.5	29.5	9.5
2½	58.5	5.82	32.5	12.5	32.5	12.5
3	76.5	7.62	32.5	12.5	32.5	12.5
3½	92.0	9.20	34.5	14.5	34.5	14.5
4	$1.09	10.89	34.5	14.5	34.5	14.5
5	1.48	14.81	37.0	17.0	37.0	17.0
6	1.92	19.18	37.0	17.0	37.0	17.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base $ per 1 prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.10
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	28.62	19.42	23.08
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2¾	12	29.65	36.32	29.57	34.76
3	12	32.11	39.33	31.33	36.84
3½	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates— Carbon Base 10%	Plates— Carbon Base 20%	Strip— Cold-Rolled Carbon Base Both Sides	Sheets— Carbon Base 10%	Sheets— Carbon Base 20%	Sheets— Cu Base Both Sides
302	....	....	....	19.75	27.50	77.00
304	25.00	28.00	....	20.75‡	27.50	77.00
		29.50		24.50		
309	30.50	35.00	....	....	....	....
310	36.50	41.00	....	....	....	144.00
316	29.50	31.50	....	26.00	36.50	....
		34.00				
317	34.50	39.00	....	....	....	....
318	38.50	38.00	....	....	....	....
321	26.50	31.00	....	23.00	33.00	111.00
347	27.50	30.50	....	24.00	33.50	130.00
		32.00				
405	21.25	27.75	....	....	....	....
410	20.75	27.25	....	....	....	....
Nickel	33.25	44.25	41.00	54.00	....	....
Inconel	41.00	53.50	....	....	....	165.00
Monel	34.75	45.75	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Coatesholocken, Pa. A3 and New Castle, Ind. 1-4; stainless-clad plates, Claymont, Del. W16, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:

½-in. & smaller diam.	15
⅝-in. & ¾-in.	18.5
⅞-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap, and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

H.P. & C.P. Square:	Reg.	Heavy
½-in. & smaller	15	15
⅝-in. & ¾-in.	12	6.5
⅞-in.-1½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ¾-in.	16.5	6.5
⅞-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ¾-in.	23	17.5
⅞-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or key quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ¾-in.	29.5	22
⅞-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
	Light	
⅛-in. & smaller	35	
½-in. to ¾-in.	28.5	
⅞-in. to 1½-in.	26	

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:

¾-in. & smaller	42
⅞-in. through 1 in.	34
Longer than 6 in.:	
¾-in. & smaller	26
⅞-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in. larger	7.85c
⅞-in. under	36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers . . List to list-plus-50c.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Diam.—Inches	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
4.5⅜	40	21.50
3	40	22.61
2½	24,30	23.15
2	24,30	25.36

CARBON

40	100,110	8.03
35	100,110	8.03
30	84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03
14	60,72	8.57
10,12	60	8.84

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.00	36.50	31.25
303	43.00	40.00	33.75
304	43.00	38.50	32.75
309	55.50	54.50	44.25
316	56.50	58.50	48.75
321	49.00	48.00	36.75
347	53.50	52.00	41.25
410	36.50	36.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Baltimore, Types 301 through 347 sheet, except 309 E2.

Brackenridge, Pa., sheets A4*

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416; 501 & 502, S18.

Cleveland, strip A7.

Detroit, strip, except Types 303, 309, 321, 416, 420, 501 and 502 M1.

Dunkirk, N. Y., bars, wire A4*

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., Types 302, 304 and 316 strip and wire C18.

Massillon, O., all products, R2.

McKeesport, Pa., bars, sheets except Type 416 U5.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5†.

Pittsburgh, sheets C18.‡

Reading, Pa., bars and strip, except 55.50c for Type 309 strip and 44.75c for Type 309 bars, C4.

Sharon, Pa., strip, except Types 303, 309, 316, 416, 501 and 502 S3.‡

So. Chicago, Ill., bars & structurals U5†.

Syracuse, N. Y., bars, wire & structurals C18.‡

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, except 309, W2 quotes 0.25 cents higher.

Washington, Pa., bars, sheets & strip, except Type 309 sheets 56.00c and bars 44.75c, J3.

Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 61.50c, strip 63.00c, W4.

Watervliet, N. Y., structurals & bars A4*.

Waukegan, bars & wire A7*

West Leechburg, Pa., strip, A4*

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 C8.

Higher prices quoted: *June 26; July 2; †June 27, ‡July 9.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	30.00-35.00
Toluol, one deg.	26.00-33.00
Industrial xylol	25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia	$32-$45

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums)	17.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

	Cents
Sponge iron	
98+% Fe, carlots	16.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	42.50
Unannealed, 99 + % Fe	36.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Brass, 10-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 tons	50.00
Copper:	
Electrolytic	43.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	83.00
Nickel-Silver, 10-ton lots	44.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	23.00-30.50
Tungsten:	Dollars
99%, minus 80 to 200 mesh, freight allowed:	
1000 lb and over	4.00
Less than 1000 lb	4.15
98.8% minus 65 mesh, freight allowed:	
1000 lb. and over	4.15
less than 1000 lb.	4.25
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb.	2.85
200 to 500 lb.	3.10
less than 200 lb.	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

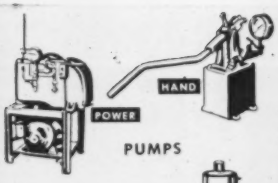
BEEHIVE OVENS

Connellsvll.fur.	$14.50-15.00
Connellsvll.fdry.	17.00-18.00
New River, foundry	21.30
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

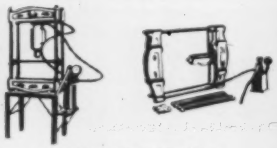
Kearney, N. J., ovens	$22.75
Everett, Mass., ovens	
New England, del.	*24.50
Chicago ovens	23.00
Chicago, del.	24.40
Terre Haute, ovens	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	24.28
Cincinnati, del.	25.73
Detroit, del.	26.71
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens	24.00
Cleveland, del.	25.75
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del.	21.69
Philadelphia, ovens	22.70
Nevillelsland, Pa., ovens	23.00
Swedeland, Pa., ovens	22.60
St. Louis, ovens	
St. Louis, del.	25.40
Portsmouth, O., oven	22.50
Cincinnati, del.	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.75
Flint, del.	26.49
Pontiac, del.	25.42
Saginaw, del.	26.81

* Or within $4.15 freight zone from works.



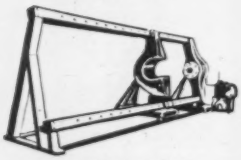
PUMPS

CYLINDERS

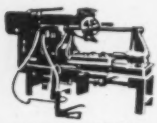


UNIVERSAL PRESS

SHOP PRESS



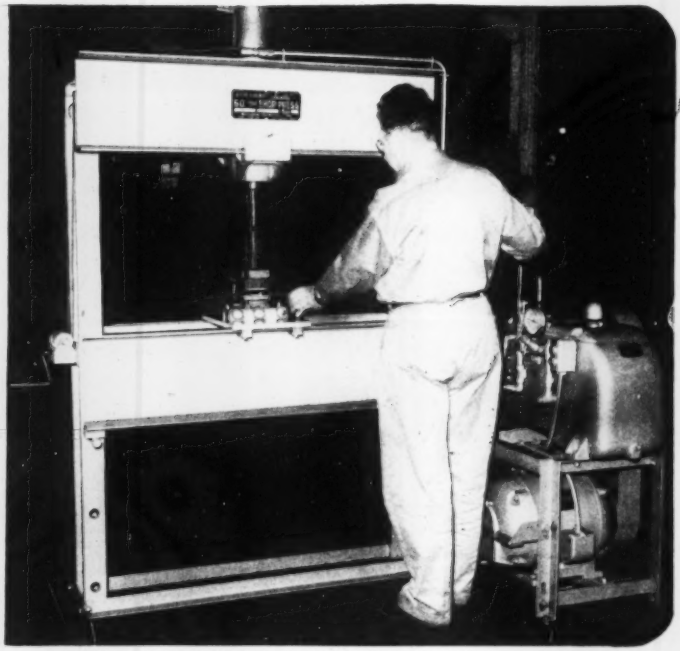
FORCING PRESS



TRACK PRESS

PINION PULLER

JACKING UNIT



Above is a standard Rodgers 60 ton Shop Press with a Rodgers Power Pump. Other models have capacities of 80, 100, 150, 200, 300 and 400 tons.

HERE'S Rodgers Hydraulic POWER ...to do 101 jobs faster, better, easier

You'll find a Rodgers Shop Press is the finest all-around time-and-labor-saving equipment you can have in your plant . . . for a multitude of pressing, forming, bending, straightening jobs . . . for die tryout . . . and even short production runs.

Their many exclusive features make Rodgers Shop Presses unusually versatile in performance . . . and there are several standard models and capacities to suit most every shop or plant requirement.

Other Rodgers Hydraulic Equipment is available too, for *your* special jobs.

SEND FOR CATALOGS

Complete details of Rodgers Equipment are covered in available catalogs. Write for them.

HYDRAULICS Rodgers THE WORLD MOVES

Rodgers Hydraulic, Inc.

7423 WALKER ST., ST. LOUIS PARK, MINNEAPOLIS 16, MINN.

HYDRAULIC POWER EQUIPMENT

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡		Carbon	Floor
New York (city)	6.27	7.20	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.90	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.06	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††*	6.00	6.25	7.56
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††*	5.80	6.05	7.36
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.32
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.96	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.40	7.95	5.75	...	5.75*	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwaukee (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90§	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm (w'hse)	5.60	6.40	6.75§	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05§	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85§	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
San Francisco	6.65	7.80*	8.90§	6.60	...	6.45	8.20	...	6.45	6.50	8.60
Seattle-Tacoma	7.05	8.60§	9.20§	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded); and Los Angeles (gage extra excluded; ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; *—500 to 1499 lb; †—450 to 1499 lb; ‡—3500 lb and over; §—1000 to 1999 lb.

ORES

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E. Pa.

Foundry and basis 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports.

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	62.00

Manganese Ore

Indian manganese, 46-48%, nearby, 92.00-96.00c per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.8c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00
Domestic—rail nearest seller	
48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

REFRACTORIES

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Hayward, Ashland, Ky., Clearfield, Curwensville, Pa., Ottawa, Ill., $116.60. Hard-fired, St. Louis, Vandalia, Mo., Olive Hill, Ky., $156.20.

High-Heat Duty: Salina, Pa., $99.60. Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, Curwensville, Lumber, Lockhaven, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Ky., Troup, Athens, Tex., Stevens Pottery, Ga., Bessemer, Ala., Portsmouth, Oak Hill, O., Ottawa, Ill., $94.60.

Intermediate-Heat Duty: St. Louis, Farber, Vandalia, Mo., West Decatur, Orviston, Beach Creek, Curwensville, Lumber, Lockhaven, St. Marys, Clearfield, Pa., Olive Hill, Hitchins, Haldeman, Ashland, Hayward, Ky., Athens, Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $88; Bessemer, Ala., $79.20.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., $79.20; Parral, O., $78.50; St. Marys, Pa., $76; Ottawa, Ill., $70.

Ladle Brick

Dry Press: Chester, New Cumberland, W. Va., Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., $66.

Wire Cut: Chester, Wellsville, O., $64.

Malleable Bung Brick

St. Louis, Vandalia, Farber, Mo., Olive Hill, Ky., $105.60; Beach Creek, Pa., $94.60; Ottawa, Ill., $90.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $94.60; Hays, Pa., $100.10; Joliet, Rockdale, Ill., E. Chicago, Ind., $104.50; Lehi, Utah, Los Angeles, $111.10.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $92.40.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $93.50.

Basic Brick

Per net ton, Baltimore or Chester, Pa. Burned chrome brick, $73-$78; chemical-bonded chrome brick, $77-$82; magnesite brick, $99-$104; chemical-bonded magnesite, $88-$93.

Magnesite

Per net ton, Chewelah, Wash. Domestic dead-burned, ⅝" grains; bulk, $36.30; single paper bags, $41.80.

Dolomite

Per net ton. Domestic burned bulk; Bonne Terre, Mo., $12.15; Martin, Millersville, Narlo, Clay Center, Woodville, Gibsonburg, Bettsville, O., Millmeyer, Plymouth Meeting, Blue Bell, Williams, Pa., Millville, W. Va., $13.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅝ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.95c per lb of briquet, c.l. packaged 11.75c, ton lot 12.85c, less ton 13.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 11.15c, per lb of briquet, c.l. packed 11.95c, ton lot 12.75c, less ton 13.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.55c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2¼ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

NOTE: For current quotations on manganese, titanium and "other" ferroalloys, see page 139. July 2 issue; for chromium, silicon, vanadium, boron, tungsten alloys, page 135, July 9.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Apr. 19, 1951

STEELMAKING SCRAP COMPOSITE

July 12	$44.00
July 5	44.00
June 1951	44.00
July 1950	37.04
July 1946	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

No. 1 Heavy Melting Steel (Grade) 1

Basing Point	Dealer, Industrial	Railroad
Alabama City, Ala.	$38.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Point, Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 2 Heavy Melting	—$2.00
3. No. 1 Bushelling	Base
4. No. 1 Bundles	Base
5. No. 2 Bundles	— 3.00
6. Machine Shop Turnings	—10.00
7. Mixed Borings & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Bushelling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Frdy. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	+ 2.00
21. 1 foot and under	+ 4.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	+ 3.00
24. Heavy Turnings	— 1.00

Special Grades

25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively. (2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10. (3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth. (4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces of hundredths. (5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering. (2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12. (3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 heavy melting steel less $15.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2. No. 2 Heavy Melting Steel	—$2.00
3. No. 2 Steel Wheels	Base
4. Hollow Bored Axles and Integral axles with keyways between the wheelseats	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, switches	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 9.50
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails, Cut Rails	+ 7.00
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 5.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 8.00
Bolsterw & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+ 12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	+ 8.00
32. Boilers	+ 6.00
33. No. 2 Sheet Scrap	+13.00
34. Carsides, Doors, Car Ends, cut apart	+ 6.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14. (2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel. (3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceeed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1.	No. 1 (Cupola)	$49.00
2.	No. 2 (Charging Box)	47.00
3.	No. 3 (Hvy. Breakable)	45.00
4.	No. 4 (Burnt Cast)	41.00
5.	Cast Iron Brake Shoes	41.00
6.	Stove Plate	46.00
7.	Clean Auto Cast	52.00
8.	Unstripped Motor Blocks	43.00
9.	Wheels, No. 1	47.00
10.	Malleable	55.00
11.	Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 3 cast iron. (2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 1, No. 2 or No. 3, $8.
(2) For hydraulically compressing Grade No. 4, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3.
(4) For preparing into Grade No. 23, $6.
(5) For preparing into Grade No. 14, $6.
(6) For preparing into Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) For preparing into Grade No. 17 or Grade No. 21, $11.
(8) For preparing into Grade No. 18 or Grade No. 20, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intrasit preparation of any grade of steel scrap of railroad origin shall be:
(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
(3) For preparing into Grade No. 16, $4.
(4) For preparing into Grade No. 17, $5.
(5) For preparing into Grade No. 21, $4.
(6) For preparing into Grade No. 23, $4.
(7) For preparing into Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:
(1) For preparing Grade No. 8 into grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3, into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commissions shall be payable to a broker in excess of $1.

Unprepared Scrap

For unprepared scrap, other than materials suitable for hydraulic compression, ceiling basing point prices shall be $8 per ton beneath ceiling of the prepared base grades.

For unprepared material which when compressed constitutes No. 1 bundles, ceiling basing point price shall be $6 per ton beneath ceiling for No. 1 bundles; or when compressed constitutes No. 2 bundles ceiling basing point price shall be $8 beneath ceiling basing point price for No. 2 bundles.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

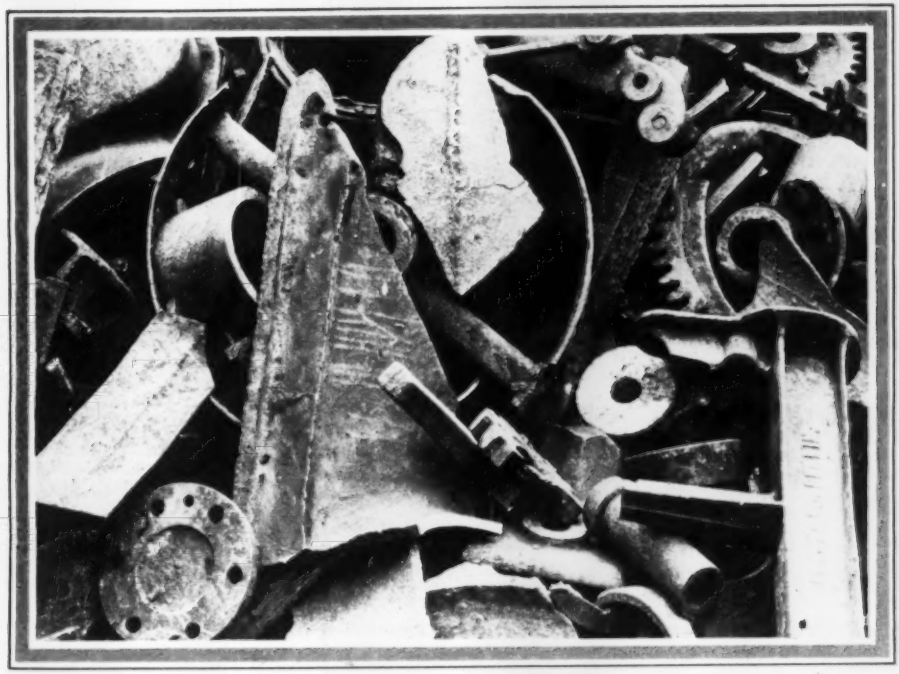
Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c.
Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 60c.
Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c.
Coatesville, Pa., 50c; Conshohocken, Pa., 20c.
Detroit, 95c; Duluth, Minn., 50c.
Harrisburg, Pa., 51c; Houston, Tex., 37c.
Johnstown, Pa., 75c.
Kansas City, Mo., 78c; Kokomo, Ind., 51c.
Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c.
Phoenixville, Pa., 51c; Pittsburg, Calif., 60c; Pittsburgh (including Beesemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c.
St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c.
Warren, Pa., 75c; Weirton, W. Va., 70c.
Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	34.00
Mechanical Bundles	33.00
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	28.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushlings new factory, prep'd	33.00
Bushelings new factory, unprep'd	28.00
Short Steel Turnings	28.00
Cast Iron Grades*	
No. 1 Machinery Cast	58.00-60.00

* F.o.b. shipping point.



#1 machinery cupola cast

use:

#1 Machinery (Cupola Cast) is the bellwether grade of scrap consumed in the process of Cupola charging. It is prepared by the dealer under a drop to Cupola size. Controlled weight enables this scrap to be handled by one man. It has a definite advantage in mixtures because the analyses are generally within narrow ranges and form a stable part of the mixture.

source:

Cast iron derived from industrial, automotive, agricultural and public utility machinery.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by personnel who is steeped in every phase of scrap knowledge, is ready to meet your every scrap problem.

specifications:

#1 Machinery (Cupola Cast). To contain all kinds of machinery and similar cast iron scrap, nothing under 10 pounds, not over 24" x 30" and no piece to weigh over 150 pounds. To contain no brake shoes, cast iron soil pipe, stove scrap or burnt iron of any description and to be free from steel nuts.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

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Availability is worth money to the manufacturer. Cost reductions, increased profits made possible by new things become effective only when the new things are in your plant. There is a man in your market who makes it his business to learn all about, and to procure, the new things developed for production and maintenance operations. He enables you to see the new product, tool or machine and to know exactly what it will do before you buy. He will take it off his floor or out of his great stock and transport it to your plant the same day you decide that you want it. Availability is his specialty.

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"This man" is an industrial distributor or a specialist in certain industrial items. You will find him listed in the classified section of your telephone book—most likely under the heading Bars, bronze or Bearings, bronze. If he is the leading distributor, he almost certainly is the Bunting Distributor. He carries in stock for your money saving convenience Bunting Standard Stock Industrial Bearings, Electric Motor Bearings, and Precision Bronze Bars—ask him for catalog

There are approximately 2000 Industrial Distributors serving every industrial section of the United States. In 1948 their total sales were more than $3,000,000,000. They carry an average inventory of $500,000,000, turn their stocks 5 to 6 times per year, fill 200,000 orders per day, have 12,000 outside salesmen and engineers, 10,000 inside telephone order expeditors, operate 8000 trucks delivering merchandise on which their average net profit is .0292 cents per dollar of sales.

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BRONZE BEARINGS • BUSHINGS • PRECISION BRONZE BARS

THE BUNTING BRASS & BRONZE CO., TOLEDO 9, OHIO

The Metal Market

Demand for copper and aluminum in third quarter exceeds supply by about 35 per cent. Non-rated consumers will encounter increasing difficulty in obtaining requirements

SUPPLIES of major nonferrous metals will remain tight over the balance of this year regardless of outcome of present negotiations for a truce in Korea. Requirements for metals under the defense program are mounting and probably will not reach their peak until early 1952.

Total unrestricted demand for copper, aluminum and steel for the third quarter is about 35 per cent in excess of supply, Defense Production Administration says. Production of copper and copper-base alloys is expected to total about 557,000 tons in the third quarter; aluminum, 299,000 tons; steel, 20,825,000 tons.

In establishing program levels governing the use of these three metals in the third quarter, nondefense consumption was reduced in general by limiting purchases to fixed proportions of "normal" usage. In the case of aluminum, manufacturers of consumer durable goods other than automobiles were held, in general, to 50 per cent of their nondefense consumption during first half of 1950. Copper allowance was 60 per cent.

National Production Authority issued order M-74, prohibiting the use of copper or copper-base alloys in the manufacture of 30 items of building materials after July 1. The order, in effect, takes over many of the restrictions on the use of these materials in builders' hardware items formerly included in order M-12.

Order Full Zinc Allocation

Slab zinc will be placed under complete allocation beginning Aug. 1. NPA took this action in order to channel available supplies of the metal more effectively to the defense program and to civilian production. Amendment to order M-9 was deemed necessary by the continued shortage of zinc and by anticipated heavy zinc requirements of orders carrying ratings under CMP.

NPA said the regulation will assure not only sufficient zinc to meet rearmament needs, but also will provide for more equitable distribution of the remaining metal among nondefense consumers. The amendment is expected to be especially helpful to many small consumers who, in recent months, have been cut off from their normal sources of supply as a result of defense demands.

No person may accept delivery of slab zinc for any purpose beginning Aug. 1 unless such acceptance has been authorized previously by NPA on an approved allocation form. Excepted from this provision are: Deliveries of slab zinc to the General Services Administration for its stockpile; acceptance of slab zinc directly from a foreign source for the sole purpose of resale without change in form; small consumers of zinc.

Reports—All producers of slab zinc are required to file reports on the 20th of each month and consumers on the 15th. Other sections of the amendment permit NPA to direct producers to set aside a specific portion of their production to meet directives, and to assist in the placement of orders when holders of authorized allotments are unable to find sources of supply.

The shortage in zinc supplies tends to detract from the commendable record being written by the smelting industry. Production is second only to that of the peak World War II year, 1943. Output of slab zinc in the first half of this year totaled 467,643 tons, including June output of 77,679 tons. Lacking reserves, shipments are limited to about this level, having totaled 79,299 tons in June. Smelters' stocks at the end of June amounted to only 15,791 tons compared with 17,411 tons at the end of May. Unfilled orders now total 73,304 tons.

Explores Lead-Zinc Deposits

Two contracts were approved by Defense Minerals Administration for exploratory work on separate lead-zinc properties in Wisconsin. These are the first contracts approved in the upper midwest under the "matching fund" principle in which the government contributes a percentage of the cost in search for new sources of strategic and critical minerals. The government contribution for lead and zinc is 50 per cent.

Exploration contracts have been entered into with the following: E. P. Scallon, St. Paul, exploratory churn-drilling for a total of 4000 feet on lead-zinc property in Grant county, Wisconsin; total cost, $7500. Dodgeville Mining Co., Madison, Wis., exploratory drilling for a total of 6000 feet on lead-zinc property in Iowa county, Wisconsin; total cost, $8040.

$500 Million Alcan Plant

Aluminum Co. of Canada's new reduction plant in Northern British Columbia will cost $500 million. With production pegged at 1.1 billion pounds of pig aluminum annually, plant will require tremendous electrical energy. First stage of power development will supply 800,000 horsepower. Water will be plunged through a 10-mile tunnel beneath the peaks of the Tahtsa Mountain range to the turbines. British Columbia offers cheap electrical power, and location was chosen with this in mind. Bauxite will come from British Guiana, cryolite from Greenland, fluorspar from Southern Europe.

RFC Tin Stocks Increase

Reconstruction Finance Corp. has made no move so far to re-enter the world tin market. Trade reports indicate that its sales in the first six months of this year were slightly less than new supplies obtained from the Texas City, Tex., smelter. RFC's stocks are believed to have gained slightly over the 18,618 tons reported on Jan. 1. The agency's selling price holds at $1.06 a pound for Grade A.

INVASION PIPE: Lightweight aluminum pipe is dropped by a fast-moving helicopter in rugged tests at Ft. Belvoir, Va., to determine suitability for carrying fuel, oil and water to operation areas of a mobile army and an emergency-based air force. The aluminum invasion pipe was a cooperative development of Army engineers and Aluminum Co. of America. Helicopters can carry at least double their normal pipe load when pipe is made of aluminum. Here twelve 20-foot lengths are dropped

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 29.00c; 88-10-2 (No. 215) 44.50c; 80-10-10 (No. 305) 35.00c; No. 1 yellow (No. 405) 25.50c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 18.85c, delivered.

Lead: Common 16.80c; chemical 16.90c; corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb. c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 106.00.

Antimony: American 99-99.8% and over but not meeting specifications below 42.00c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 42.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, large lots, New York, $210-213 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99% $2.10 per lb for 500 lb (kegs); $2.12 per lb for 100 lb (case); $2.17 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 90 1/8c per oz.

Platinum: $60-93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill, effective May 23, 1951)

Sheet: Copper 40.18; yellow brass 37.28; commercial bronze, 95% 40.18; 90% 39.78; red brass, 85% 38.86; 80% 38.47; best quality 38.07; nickel silver, 18% 50.99; phosphor-bronze grade A, 5% 59.42.

Rod: Copper, hot-rolled 36.03; colddrawn 37.28; yellow brass free cutting, 31.70; commercial bronze, 95% 39.87; 90% 39.47; red brass 85% 38.55; 80% 38.16.

Seamless Tubing: Copper 40.22; yellow brass 40.29; commercial bronze, 90% 42.44; red brass, 85% 41.77.

Wire: Yellow brass 37.57; commercial bronze, 95% 40.47; 90% 40.07; red brass, 85% 39.15; 80% 38.76; best quality brass 38.36.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.285; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 30.10, l.c.l. 30.28. 100,000 lb lots 29.35; magnet, del., 15,000 lb or more 34.50, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Minimum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	Round— R317-T4,	R317-T4	Hexagonal—	17S-T4
0.125	52.0	....	....	....
0.156-0.188	44.0	....	....	....
0.219-0.313	41.5	....	....	....
0.375	40.0	46.0	....	48.0
0.406	40.0	....	....	....
0.438	40.0	46.0	....	48.0
0.469	40.0	....	....	....
0.500	40.0	46.0	....	48.0
0.531	40.0	....	....	....
0.563	40.0	....	....	45.0
0.594	40.0	....	....	....
0.625	40.0	43.5	....	45.0
0.688	40.0	....	....	45.0
0.750-1.000	39.0	41.0	....	42.5
1.063	38.0	....	....	41.0
1.125-1.500	37.5	39.5	....	41.0
1.563	37.0	....	....	....
1.625	36.5	....	....	39.5
1.688-2.000	36.5	....	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $22.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $22.00 per cwt. Traps and bends: List prices plus 60%.

ZINC

Sheets, 24.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 23.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 23.50-24.50c; over 12-in., 23.50-24.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 4.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 37.69c; oval 37.19c. Cast 37.375c, delivered in eastern territory.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 60.5c, under 1000 lb 62.8c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98% ½-oz ball, in 200 lb drums, 1 to 900 lb, 19.00c; 1000 to 19,900 lb, 18.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 29.25c; over 200 lb 28.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 68.50c; 10,000 to 30,000 lb, 69.50c; 3000 to 10,000 lb, 70.50c, 500 to 3000 lb 71.50c; 100 to 500 lb 73.50c; under 100 lb, 76.50c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 35.00c; 400-lb bbl, 33.00c; up 10,000 lb, 32.50c; over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Sodium Stannate: 25 lb cans only, less than 1000 lb, to consumers 79.20c; 100 or 350 lb drums only, 100 to 600 lb, 64.50c; 700 to 1900 lb, 62.00c; 2000 to 9900 lb, 60.20c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver 10%	21.50	21.25	20.75
Phos. bronze, A	27.00	26.75	25.75

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25, No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 19.50; No. 1 composition borings 19.25 per lb of Cu content plus 8 cents per lb of tin content; mixed brass borings 16.25 per pound of Cu content plus 7½ cents per lb of tin content; unlined red car boxes 18.25; cocks and faucets 16.75; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 12.25c; new clippings and trimmings, 14.50; engravers' and lithographers' plates, 14.50; die cast slabs, min. 90% zinc, 12.25; old zinc scrap, 11.25c; forming and stamping dies, 11.25; new die cast scrap, 10.75; old zinc die cast radiator grills, 10.50; old die cast scrap, 9.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 17.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c, in lots less than 15,000 lb. Used storage batteries (in boxes) drained of liquid, 6.60c for 15,000 lb or more; 6.40c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 15.25c per lb. In addition, brokerage commissions are permitted.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
July 2-12	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June 26-30	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June 18-27	24.50	16.80	17.50	106.00	19.00	42.00	56.50	87.75
June 15-16	24.50	16.80	17.50	111.00	19.00	42.00	56.50	87.75
June 14	24.50	16.80	17.50	118.00	19.00	42.00	56.50	87.75
June 13	24.50	16.80	17.50	123.00	19.00	42.00	56.60	87.75
June 8-12	24.50	16.80	17.50	126.00	19.00	42.00	56.50	87.75
June 7	24.50	16.80	17.50	136.00	19.00	42.00	56.50	87.75
June 1-6	24.50	16.80	17.50	136.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	136.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16

NOTE: Copper, Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime west, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex., Nickel electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

GEARS

of Neloy (OR NELOY MOLY)

THE Preference of INDUSTRY

(NE) is the symbol of quality recognized by users of industrial gears everywhere. Our Foundries specialize in Gear Blank Castings of Alloy and Carbon Steel. The facilities of the National-Erie Corporation at your command, permit complete control from raw material to the finish machined gears. Spur, bevel and Sykes Herringbone of Neloy (or Neloy Moly) meet with outstanding success in industry because they are giving excellent service in many varied applications.

First and final costs of Neloy (or Neloy Moly) gears are reasonable. The (NE) Flame Hardening Process combines the high surface hardness of carburized or case hardened treatment, combined with the toughness of a fully quenched medium carbon alloy steel.

Neloy (or Neloy Moly) is the Ideal alloy steel for gears . . . the Preference of Industry. Let us help you meet your gear requirements.

Write for bulletin No. 7.

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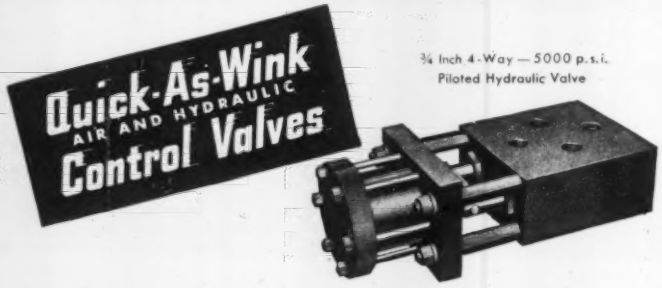
ERIE, PENNSYLVANIA • U. S. A.



PILOT OPERATED Hydraulic Valve

For hydraulic systems to 5000 p.s.i.

● Designed for controlling double acting hydraulic cylinders. The pilot cylinder is controlled by any type of 4-way air valve and is operated either automatically or manually from a convenient control station. Machined steel housing, hard chrome plated ground and polished stainless steel plungers, molded packers sealed by valve pressure. All parts readily accessible without disturbing the piping. ½" to 4" sizes. *Write for full details.*

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AIR AND HYDRAULIC
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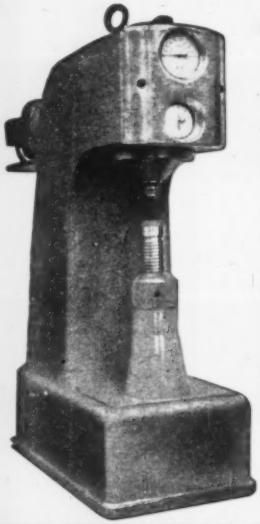
Hand, Foot, Cam, Pilot, Diaphragm and Solenoid Operated

Mfd. by C. B. HUNT & SON, INC., 1924 East Pershing St., Salem, Ohio

Brinell Testing
at PRODUCTION LINE SPEEDS



Simply set tolerance hands on the lower dial of this Brinell Hardness Tester to the desired limits and the operator merely notes that the indicator points stop within them.

No grinding or preparation of parts is necessary. Foot operation permits free use of both hands. Tests are completed as rapidly as the operator can handle the parts.

Standard Brinell test loads are used . . . machine is motor-driven . . . loads are applied hydraulically . . . round and flat parts are handled equally well . . . no springs or delicate clutches to affect load.

GET FURTHER DETAILS

WRITE FOR LITERATURE

DETROIT TESTING MACHINE CO.
9390 GRINNELL AVENUE • • • DETROIT 13, MICH.

Tubular Goods . . .

Tubular Goods Prices, Page 139

Boston—If fourth quarter plate allocations for natural gas lines are not recommended, status of numerous orders for lead-in lines placed by utilities is uncertain. These involve substantial foreign lots. However, reversing an earlier move, plates for the New England main line pipe may now be recommended by PAD. Distributors are taking allocations of merchant steel pipe, but there is an easing in pressure, notably on smaller buttweld sizes with some diverting small lots. Seamless is sold through September at set-aside limits.

Sheets, Strip . . .

Sheet and Strip Prices, Page 135 & 136

Pittsburgh—Most September rolling schedules are set; only a limited tonnage of hot-rolled sheet will be available, about 95 per cent going for defense and directives. Cold-rolled sheet supply for September will be better than the hot-rolled situation, but less tonnage will be available than in August. Estimated 80 per cent cold-rolled sheet tonnage will go for defense and related effort.

Much of the confusion attending transition to CMP has disappeared. No relief is expected on hot or cold-rolled sheets in view of the steadily mounting defense and directive tonnage. Virtually all producers expect full CMP by fourth quarter, barring a change in the government's preparedness program. Step in this direction is NPA order to devote 70 per cent minimum August production to defense, 54 per cent minimum of cold-rolled, 80 per cent minimum of galvanized and 95 per cent minimum of electrical sheet.

New York—Sheet sellers report a rapidly mounting volume of CMP orders for fourth quarter. Consumers can now place up to 70 per cent of their third quarter orders for the final three months of the year. Later, when they receive formal allocations from Washington, they likely will be able to step up their tonnage for that position. Meanwhile, most producers must cut into their 45-day lead time in arranging September schedules.

Boston—With most cold strip converters getting allocated hot-rolled tonnage near specified volume, controlled distribution for September approximates 60 per cent of scheduled output. Open-end volume will be about 40 per cent, indicating that more consumers of cold strip will not be too badly pinched for steel. Some progress toward elimination of overdue tonnage is being made.

Philadelphia — Hot and galvanized sheets are in tight supply, somewhat in contrast with the situation in cold-rolled. At least some cold-rolled tonnage is expected to be available for non-rated consumers in September; little, if any, of the other grades of sheet likely will be on hand. There is less demand for cold-rolled for defense, as reflected by the new set-asides: 54 per cent for cold-rolled against 70 per cent for hot-rolled and 80 per cent for galvanized.

Middletown, O.—Armco Steel Corp. has begun work on a $2 million proj-

ect to increase its Butler, Pa., Division's production of electrical steel. A battery of new annealing furnaces is being constructed and equipment is being added to process this type of steel. In addition, new shears are being installed and the shipping facilities of the plant are being increased.

Los Angeles — Materials shortages and production restrictions caused large-scale worker layoffs at district automobile plants. Lighter consuming buying has lowered gray market steel prices to mill price plus $50 per ton.

Chicago— Sheetmakers must revise September schedules to comply with the NPA directive of July 9 limiting tonnage going to essential uses. September schedules are almost completely filled with CMP revalidations. In addition, considerable new CMP tonnage has come in recently.

Wire . . .

Wire Prices, Page 137

Boston — Production and distribution of rods will determine extent CMP allotments are met in third quarter and beyond. Hurt by vacation losses, semifinished tonnage is limited and, if 90 per cent allocation to converters is met, there will be no open-end volume. Limited rod supply endangers ability of mills to meet late third quarter CMP allotments which are generous in most cases to consumers qualifying under "B" list products.

Steel Bars . . .

Bar Prices, Page 135

Boston — Limited cold-rolled bar tonnage in small sizes will be available in September beyond controlled volume, although heavy run of revalidated orders for carbon grades came late at deadline. Some CMP volume is being booked for fourth quarter in both carbon and alloys. Mills are striving to get out as much overdue tonnage in August as possible. Tonnage not qualifying for revalidation for September under CMP has been dropped.

Pittsburgh—Bars are in most critical supply straits of any product. NPA placed hot-rolled bar set-asides for September at 78 per cent minimum of expected production. No announcement has been made concerning cold-finished or alloy bars, but entire production of both products is expected to go for defense. Trend toward complete CMP is evident and, if government defense spending continues after Korean peace, entire production will be controlled by fourth quarter.

There is little hope for relief in bar market with mounting defense demands. Seventy-five day lead time for cold-finished bar rolling schedules means that September producing plans are about set.

Philadelphia — Jump in hot-rolled bar set-asides to 78 per cent did not make too much difference with a number of sellers, for they were already loaded up with rated business for September. Many CMP's that came in along with the DO-conversions likely will be carried into fourth quarter. Non-rated consumers are out of luck completely in such cases.

Los Angeles — Kaiser Steel Corp. ceased production of merchant bars.

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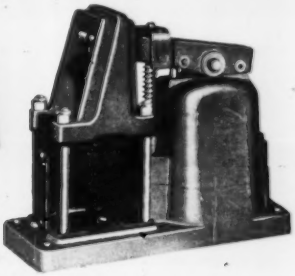

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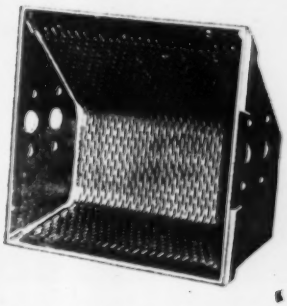

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Sales Offices In Principal Cities

Aircraft fabricators' bar requirements are down 20 per cent. Cold-drawers are booked three months ahead on rated orders, representing 75 per cent of total orders.

Plates . . .

Plate Prices, Page 135

Philadelphia—Plate supply is acute. Latest schedule of set-asides is 92 per cent for sheared plates, plus an additional 3 per cent for Navy tonnage directives, and 95 per cent for strip plate. Considering the probable carryover from August, plate mills will have nothing left for unrated tonnage. Most mills were loaded up with rated orders before this latest increase in set-asides was announced.

Lukens Steel Co. resumed operations on its 140-inch mill July 12 after a suspension for repairs since the first of the month. Alan Wood Steel Co.'s 84-inch mill, which was closed down for repairs June 28, is expected back in operation no later than July 23.

Boston—While all DO orders have been validated under CMP, volume is not heavy in this district compared with overall plate directives. Plate distribution will be largely by directive; demand for listed "B" products being relatively light, fabricators in some instances actually take reductions under CMP. Exceptions are weldment shops with backlogs heavily filled with former DO orders. For September, open-end tonnage will be lower. Small tank fabricators are booking more defense volume, but in some cases recent heavy deliveries of heads overbalance plate receipts.

Pittsburgh—No free tonnage will be available to plate users in September. Plate production is entirely on a directive basis. Fabricators who hold non-rated jobs complain bitterly since their supply is shut off. Full CMP is in effect so far as plate production is concerned. NPA order telegraphed to producers July 6 specified order of priority with directive, ACM and rated orders in that sequence.

Chicago—With advent of CMP plate users are requesting tonnages widely in excess of amounts heretofore taken. Behind the move is the desire of consumers to obtain accommodation at mills close at hand to reduce freight charges. Under the new NPA directive, plate mills now must reschedule and reject overages previously booked

Birmingham—Pressure for plates continues. Mills are on a virtual capacity schedule, but demand exceeds supply. Car-building continues as the prime plate consumer, although considerable construction is evident in the district.

Structural Shapes . . .

Structural Shape Prices, Page 135

New York—Fabricators recently received a number of orders certifying DO rated tonnage under CMP for third quarter delivery, but they don't know what they are going to be able to do with them. They are overbooked for July and August and have far more orders than they can possibly handle for September. Much depends on what they can get from the mills for September shipment. They have heavy fabricating schedules on other work that will have to be considered.

Some of the present difficulty stems from the fact there was a substantial influx of DO ratings at the tag end of June against orders that were already on fabricators' books. Fabricators had urged contractors for some time to get ratings, but it was not until late June that several took action. These DO ratings were in excess of what the shops could handle in the third quarter and the conversion of these ratings to CMP leaves the situation no better off.

Boston—Rated fabricated structural steel contracts, validated under CMP for third quarter delivery, overextend shops and mills. Some tonnage will go into fourth quarter when confusion attending switch to new controls is expected to clear. Crux in scheduling shop operations centers in plain material with structural mills set up for September rollings. Where shop backlogs extend six months to one year, this being the case with larger fabricators, considerable readjustments are likely if original scheduled deliveries are to be met.

Pittsburgh—NPA requires structural producers to put 90 per cent of their expected output into the defense effort. Non-rated construction has practically vanished, fabricators being reluctant to take non-rated work with possibility of structural production going entirely for defense. Demand for light structurals runs high.

Philadelphia—A heavy amount of defense construction is accumulating. About the only other work being figured are bridges and some hospitals and schools approved by Washington.

Warehouse . . .

Warehouse Prices, Page 141

Philadelphia—Distributors' mill receipts so far this month are below those for the like period in June. Plates and bars are in particularly low supply. One large distributor's stocks of cold-finished bars are only one-sixth of what they were a year ago, with popular sizes virtually cleaned out. Some consumers of cold-finished are buying hot bars out of warehouse and are having them drawn to size by cold finishers, an expensive operation.

Pittsburgh—Receipts of distributors are at highest level in months, although demand far outstrips receipts. Warehousemen are not able to replenish inventories. Warehouses will receive no additionnal tonnage under CMP and, unless defense program is reduced, distributors can hope for no improvement in future supply.

Los Angeles—Vacation layoffs and lag in switching-over from civilian to defense production is easing pressure for warehouse steel. Warehouse shipments in June were 10 per cent less than in May.

San Francisco—Distributors' inventories continue to dwindle. Warehouse executives hope the turning point will come in the fourth quarter when CMP will have several months of experience behind it. Meantime, most acute items in the whole supply picture are the alloys and stainless.

Iron Ore . . .

Iron Ore Prices, Page 141

Cleveland—Iron ore lake shippers established a new record for June, totaling 13,166,130 tons and representing a gain of 1,428,179 tons over the June, 1950, total. Shipments from the Superior district for the July 4 holiday week amounted to 2,905,298 tons, lifting the movement so far this season to 35,556,990 tons compared with only 24,729,457 tons for the like period a year ago.

Pig Iron . . .

Pig Iron Prices, Page 134

Boston—Shipments to contract customers by Mystic Iron Works under terms of mutual agreement are being resumed after brief stoppage over pricing for third quarter. Consumers of foundry and malleable will pay more; Everett furnace price under schedule B of contracts is $55.25, furnace for No. 2 foundry, an advance of $3.50. GCPR price based on first quarter was $53.25 and contract price second quarter $51.75. For a few days, shipments came to a halt due to failure of OPS to approve contract pricing.

From March to May, 47 per cent of ore consumed was of foreign origin over which OPS has no control.

New York—District foundry melt regained June levels, following suspensions for vacations by various shops earlier this month. Another dip is expected in August, at which time still other foundries will suspend for vacations.

The seasonal lull has eased the pressure for pig iron, although most shops are taking all the iron they can get to replenish inventories. Were it not for the abnormally heavy proportion of scrap now being used, many foundries would be forced to curtail average weekly production. As it stands, most of them can maintain a five-day week operation. Some are working overtime, but only in other than their melting departments. Little foreign iron is being bought these days because of the high cost and uncertainty as to deliveries and specifications.

Buffalo—Tightness continues to grip the pig iron market despite vacation periods which have shut down one of the district's leading melters for two weeks. Area pro-

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duction rate may return to capacity this week as the one idle stack, may be relighted.

Pittsburgh — Pig iron purchasers expect supply to improve in event of Korean peace, but this remains doubtful. Iron production has fallen slightly with two of the 54 district stacks down for repairs which won t be completed for at least six weeks.

Philadelphia — While seasonal influences are reducing foundry iron requirements, demand still exceeds supply. Basic iron is in especially short supply, although consumers are unwilling to take more foreign iron at current prices.

Cincinnati — Pig iron market is quiet, although numerous foundry vacations have not lessened demand. The supply outlook is more unfavorable because of the disappearance of foreign iron. Beehive coke is hard to place on an easing in the oven coke market.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 139

Pittsburgh—Oven coke demand is considerably reduced over last few weeks. With two district blast furnaces off for repairs there is opportunity for some limited inventory-building. Coke of metallurgical grade is no longer a problem for foundries or steel plants here. Connellsville beehive demand has fallen and market is slow despite shipments of this grade to other coke-consuming areas.

Chicago—Foundry coke is offered freely. Lack of storage space prevents foundries from stockpiling during vacation shutdowns.

Scrap . . .

Scrap Prices, Page 142

Pittsburgh—Movement of scrap is improving slightly, but the supply situation is still critical. Inventories are dangerously low and supply is not great enough to replenish stocks. Upgrading continues to be common, but complaints from purchasers are few since they are anxious to get scrap at any price. OPS issued warnings that arrests will follow any uncovered instances of upgrading. OPS is changing charges from misdemeanors to felonies to mete out stiffer penalties to offenders. Cases of "tie-in" sales of scrap are noted. A dealer sells scrap to a producer in exchange for right to purchase finished steel, which is later sold on black market at great profit.

New York — Stringency in steel scrap is reflected by continued allocations of material at dealers' yards. Practically all scrap is being allocated. Hot weather and vacations have tended to slow yard collections and preparation of material, but by far the major cause of shortage is the heavy consumer requirements. Steel mills, some of which have only meager stocks on hand, continue to press for tonnage in an effort to sustain better than 100 per cent operations. Some consuming plants are easing operations due to vacations, but even these take all the scrap they can get to replenish inventories.

Boston—While melt by steel mills and foundries is lower this month due to vacations, steel scrap is scarce. General inventory position of melters has not been improved. Higher prices at several ports, compared with f.o.b. quotations, are drawing in some tonnage for barge shipment, chiefly for Buffalo.

Chicago—Scrap situation is unchanged with consumption steady. Less material is being allocated away from this district and the few mills near distress are receiving somewhat larger shipments against allocations. Demand for foundry grades has lessened with many jobbing foundries closed for vacation.

Cincinnati—Mills and foundries are making no progress in efforts to build scrap inventories. Suppliers are hard pressed to support the high level of melt; reliance on allocations is expanding. None in this district is cancelling allocations of scrap.

Birmingham — Demand for cast scrap has eased considerably, while steel scrap remains extremely tight. NPA allocated much Florida scrap, one of the largest suppliers of the district, to northern mills, thus aggravating the situation.

Los Angeles—Six destroyer escort vessels purchased by Kaiser Steel Corp. will provide 5000 tons of scrap for Fontana mill. Bidding is active on 100,000 tons of steelmaking scrap offered by Republic of Korea in appreciation of assistance.

San Francisco—Small tonnages of steel scrap have been arriving from the Hawaiian Islands to supplement domestic recoveries, yet the inventory situation continues to deteriorate. Lightness of shipments from Hawaii is attributed to a shortage of bottoms.

Seattle—Steel scrap continues to arrive in increasing volume, but local shipments are of poor quality. Volume of material coming from Alaska and the Pacific area is heavier and gives better results. Military and mining scrap shipments from Alaska are seasonally larger. A cargo of 9000 tons from the western Pacific arrived this week for Isaacson Iron Works.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

7000 tons, Aluminum Co. of America's reduction plant, near Wenatchee, Wash.; to Bethlehem Pacific Coast Steel Corp., Seattle.

1500 tons, units 2, Cromby station, Philadelphia Electric Co., Philadelphia; to Bethlehem Steel Co.

1255 tons, including 3706 tons silicon steel, South Broad street overpass, New Orleans, to Virginia Bridge Co., Birmingham; also 115 tons cast steel; Farnsworth & Chambers Co. Inc., Houston, contractor-engineer.

2385 tons, Army buildings, Fort Eustis, Va., through Virginia Engineering Co., Norfolk, Va.; to Lehigh Structural Steel Co., Allentown, Pa.

525 tons, alert hangars, Presque Isle, Me., Burlington, Vt., and Chicopee Falls, Mass., to Butler Mfg. Co., Minneapolis.

425 tons, additional buildings and facilities, Air Force Base, Limestone, Me., to Bancroft-Martin Rolling Mills Co., Portland, Me.; Volpe Construction Co., Malden, Mass., general contractor.

350 tons, alert hangar, Falmouth, Mass., to American Bridge Co., Pittsburgh.

100 tons, housing project 41-1, Huntsville, Ala., to Sherwood Moore Co., Birmingham; R. P. Farnsworth Co., New Orleans, general contractor; reinforcing to Joseph H. Fox Co., Birmingham.

STRUCTURAL STEEL PENDING

2000 tons, Mount Rainier ordnance depot warehouse, Washington state; bids to be invited immediately.

1000 tons or more, 300-foot square hangar, Elelson air field, Alaska; general contract to P. Kiewit & Sons Co., Seattle, $3,671,313.

1000 tons, Lehigh county bridge, Catasauqua, Pa.; bids Aug. 2.

550 tons, power house, Central Electric Power Co-op, Shamois, Mo.; bids closed July 13.

150 tons, factory, Lenear Corp., Plymouth Meeting, Pa.; bids closed July 7.

125 tons, steel superstructure, bridge, Cathance river, Bowdoinham, Me.; bids in.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1830 tons, contract C-3 deck, and contract C-1 substructure, Boston connection, part 1, Central Artery, Boston, to Bethlehem Steel Co.; V. Barletta Co., Boston, general contractor; bids June 12.

1525 tons, contract B-1 substructure, and B-3 deck, Charlestown connection, Central Artery, Boston, to Bethlehem Steel Co.; Berke-Moore Co. Inc., Boston, general contractor.

965 tons, South Broad street overpass, New Orleans, to Orleans Materials & Equipment Co., that city; also 101 tons blast plate and 113 tons roadway armor; Farnsworth & Chambers Co. Inc., Houston, contractor-engineer.

425 tons, dormitory, Wellesley College, Wellesley, Mass., to United States Steel Supply Co., Cambridge; George A. Fuller Co., Boston, general contractor.

360 tons, walls, foundations, etc. Navy oil terminal, Mukilteo, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; Dahlgren Construction Co., Seattle, general contract, $1,429,856.

250 tons, contract E-1, substructure and approaches, Central Artery, Boston, to Bethlehem Steel Co.; C. J. Maney Co. Inc., Boston, general contractor.

180 tons, dental school building, University of North Carolina, Chapel Hill, N. C., to Easterby & Mumaw Inc., Charlotte, N. C.; J. A. Jones Construction Co., Charlotte, general contractor; Carolina Steel & Iron Co., 62 tons fabricated structural steel.

110 tons, mesh, state highway, Warwick-West Warwick, R. I., to Wickwire-Spencer Steel Co., Boston; bridge, 65 tons, to American Bridge Co., Pittsburgh; S. M. Construction Co., Providence, R. I., general contractor.

100 tons, Navy oil terminal, Manchester, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; MacRea Bros., Seattle, general contract.

100 tons, addition, Melrose Hospital, Melrose, Mass., to Concrete Steel Co., Boston; Joseph J. Vaccaro, Somerville, Mass., general contractor.

PLATES . . .

PLATES PLACED

100 tons or more, 500,000-gallon elevated water tank, Fort Lauderdale, Fla., to Chicago Bridge & Iron Co., Chicago, $99,400.

PLATES PENDING

1000 tons, or more, including structurals, 1000-ton dry cargo ship for Army Transportation Corps; general contract to Puget Sound Bridge & Dredging Co., Seattle, $1,446,685.

PIPE . . .

CAST IRON PIPE PLACED

315 tons, mainly 16-inch, Fall River, Mass., to R. D. Wood & Co., Florence, N. J.

CAST IRON PIPE PENDING

250 tons, 30-inch, Logan Airport, Boston.

RAILS, CARS . . .

LOCOMOTIVES PLACED

New York, New Haven & Hartford, ten 1600-hp diesel-electric road switchers and five 1600-hp diesel-electric road freight units, to American Locomotive-General Electric Companies, Schenectady, N. Y.

Pakistan, 23 broad-gage diesel-electric locomotives, to American Locomotive Co., New York.

RAILROAD CARS PENDING

Western Pacific, 400 gondola cars and 100 hopper cars; bids asked.

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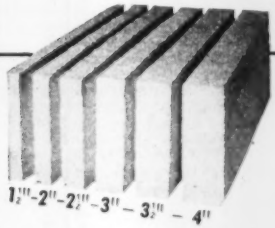

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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Marman To Triple Output

Recently granted an emergency loan of $1,250,000 for purchase of land, construction of buildings and acquisition of machinery and equipment, Marman Products Co. Inc., Inglewood, Calif., will triple manufacturing facilities by construction of a plant at 11214 Exposition Blvd., West Los Angeles, Calif. The firm manufactures clamps, straps, couplings, and aircraft fastening devices. The Defense Production Administration extended an additional $400,000 for working capital.

Will Enlarge Indiana Plant

Joy Mfg. Co., Pittsburgh, plans to enlarge its Michigan City, Ind., plant. The new facilities, which will cost about $800,000, will add 72,000 square feet to the present plant and permit an increase in productive capacity of about 35 per cent. Production at the plant includes air compressors, a wide range of large drills used in mining and construction, as well as equipment for the oil drilling industry.

American Metal Products Co.

American Metal Products Co. Inc., Los Angeles, completed construction of a warehouse addition in that city. Sheet metal, vent caps, roof lashing, sheet metal pipes and fittings are manufactured.

Plans Electronics Factory

Radio Corp. of America-Victor Ltd., Montreal, purchased a 100-acre tract of land near Prescott, Ont., for an electronics factory.

Offers German-Made Rolls

Koelsch-Foedzer Works, Siegen, Westfalia, Germany, makers of rolls for the processing of ferrous and nonferrous metals, opened a sales engineering office at 123 First Ave., New York, in charge of F. L. Floss. The company is offering deliveries within eight to ten weeks and is quoting prices at somewhat under domestic levels.

Line Material Buys Property

Line Material Co., a division of McGraw Electric Co., Chicago, will build new factory units on property adjacent to its Central plant in South Milwaukee, Wis. The first unit, a boiler room, probably will be started next spring. The three year program for the plan, begun in 1950, includes plans to replace all but two of present manufacturing buildings. An addition to Line Material's Kyle Products plant in South Milwaukee is under way and will increase that plant's size by about 30 per cent. The company is also constructing new plants in Olean, N. Y., and Sherman, Tex.

Essick Buys Machinery Firm

Sterling Machinery Co., Kansas City, Mo., has been purchased and moved to Los Angeles, Calif., by Essick Mfg. Co., Los Angeles. Essick recently completed construction on a factory addition to facilitate production of road rollers, mixers, hoists, pumps, compressors and evaporative air coolers.

Expands Chemical Plant

Construction is under way on an $8.5 million expansion of the chlorine and caustic soda producing facilities at Pittsburgh Plate Glass Co.'s Natrium, W. Va., plant operated by Southern Alkali Corp., a wholly-owned subsidiary. Originally granted a certificate of necessity by DPA covering 50 per cent of an estimated $10.2 million for the plant addition, the company has revised its cost estimates to $8.5 million or less.

Plans $3 Million Expansion

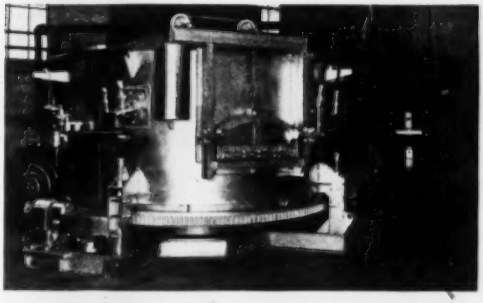
Aetna-Standard Engineering Co., Youngstown, has undertaken a $3 million expansion of its Ellwood City, Pa., plant, to enable the company to boost its defense work. The project involves over 150,000 square feet of manufacturing space, plus purchase of considerable equipment, including machine tools. Plans call for a new foundry and general office building and for doubling the machine shop.

Boosts Oxygen Production

Granite City Steel Co., Granite City, Ill., a year ago installed two generators of large capacity which the company leased from Air Products Inc., Allentown, Pa. On June 25, Granite City placed in operation a very large additional generator increasing its oxygen producing capacity by 60 per cent.

Cincinnati Gets New Plants

Work is starting on expansions by two interests, on adjoining tracts in the Evendale district, Cincinnati. Pollak Steel Co. will construct a warehouse and fabricating plant while U. S.-Burke Machine Tool Co.,



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3. **Providing better "fit-ups"**
4. **Protecting welding rods through better storage and care**
5. **Laying flat-face fillets on vertical fillet welds**
6. **Making fillet legs of equal length on horizontal fillets**

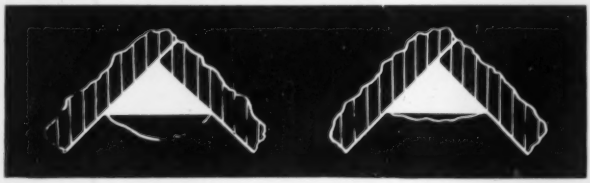
Check your horizontal and vertical fillet-welds against the illustrations on the right. Watch for future hints on improved welding techniques.

Accurate Measurement of Weldments Is Easy with this Gage

Check welds with this corrosion-resisting, stainless steel fillet-weld gage. It is a necessary tool for providing a quick, easy, accurate means of gaging fillets having either straight, concave, or convex contours of the following sizes: ¼ in., ⅜ in., 5/16 in., 7/16 in., ⅜ in., and ½ in. Easy to carry, it comes complete in a leather case.

Get yours today from your nearest G-E Welding Distributor. He can give you additional hints on how to get the most from your electrodes and equipment. You can find his name in the yellow pages of your telephone directory. Look for "General Electric" under "Welding Equipment."
General Electric Company, Schenectady 5, N. Y.

ON VERTICAL FILLETS



WASTE

On vertical fillets, you may be wasting as much as 40 percent of your weld metal. A poor contour, as shown above, may be due to one or more of the following conditions:

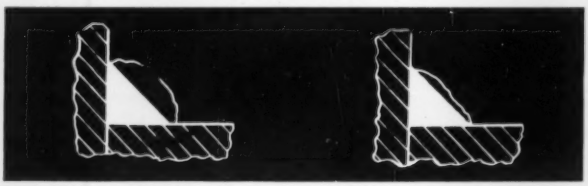
- **Arc length too short**
- **Electrode too large**
- **Forward travel speed too slow**
- **Excess whipping**
- **Excessive current. Metal runs out**
- **Wrong electrode for the job**

GOOD PRACTICE

You can prevent this needless waste of electrode by putting into practice one or more of the following suggestions:

- **Use welding current recommended by the electrode manufacturer**
- **Use as large an electrode as plate thickness will allow, but not larger than 5/16 inch in diameter**
- **Increase travel speed**
- **Change to electrode better suited for this type of joint**

ON HORIZONTAL FILLETS



WASTE

On horizontal fillets, you may be wasting as much as 30 percent of your weld metal. A poor contour may be due to one or more of the following conditions:

- **Electrode held at wrong angle**
- **Electrode too small for size of fillet**
- **Excess current, metal runs down**
- **Arc length too short, causing overlap**
- **Forward travel speed too slow**
- **Wrong electrode for this type of joint**

GOOD PRACTICE

You can prevent this needless waste of electrode by putting into practice one or more of the following suggestions:

- **Hold electrode at proper angle**
- **Use as large an electrode as possible**
- **Use welding current recommended by the electrode manufacturer**
- **Increase travel speed**
- **Use proper electrode for this type of joint**

712-6

GENERAL ELECTRIC

Carthage, O., will build a supplementary plant. Robertson Steel & Iron Co. and N. Ransohoff Inc., both of Cincinnati, acquired acreage in the vicinity but disclosed no plans for utilization of the properties.

May Build Manganese Plant

Texas International Manganese Corp. plans to build a $500,000 manganese concentrating and sintering plant at Brownsville, Tex. Output is expected to reach several thousand tons monthly. Low-grade manganese ore will be imported from Mexico.

White-Roth Machine Expands

White-Roth Machine Corp., Lorain, O., added another building to its plant. The new structure, housing manufacturing operations for special government work, increases production area by over 40 per cent. The former plant will house fabricating and assembling operations for the company's line of diesel and gas engines and compressors and manufacturing operations for special processing equipment.

General Controls Builds

General Controls Co., 801 Allen Ave., Glendale, Calif., is constructing a 24,000 square foot building. Automatic pressure, temperature, level and flow controls are manufactured. Completion is scheduled by August.

Wallace Steel Buys Plant

Wallace Steel & Supply Co., Ithaca, N. Y., purchased a former Crucible Steel Co. mill in Syracuse, N. Y. The property was purchased from Jackson M. Potter Real Estate Co. which purchased the unused mill from Crucible several years ago.

Quaker Opens Branch

Quaker Rubber Corp., division of H. K. Porter Co. Inc., Philadelphia, opened a stock-carrying branch warehouse and sales office at 872 W. Milwaukee Ave., Detroit. J. R. Alexander is the district manager of the new branch.

Granco Moves Offices

Offices of Granco Steel Products Co., a subsidiary of Granite City Steel Co., Granite City, Ill., were moved from quarters in the parent company's plant to space in a Dow Chemical Co. building in Madison, Ill. Granco Steel Products Co. manufactures and sells construction industry specialties made from Granite City Steel's high-tensile, tough-temper cold-rolled steel. Granco's test shop remained on Granite City Steel Co.'s plant premises and all production activities will continue to be centered in the steel mill.

Semet-Solvay Expanding

Semet-Solvay Division, Allied Chemical & Dye Corp., New York, producer of coke and gas, is planning a $6,940,000 expansion of facilities at its Tonawanda, N. Y., plant.

Scrap Firm Enlarges Yard

Wilkoff Co., Youngstown scrap firm, is spending over $300,000 in enlarging its Youngstown yard. The program calls for installing a scrap baling press, a 400-foot long crane runway with 90-foot span, two 700-foot tracks, and new magnets on the scrap handling cranes. This program will boost capacity from 8000 tons to about 20,000 tons monthly.

Lockheed Increases Output

Lockheed Aircraft Corp., Burbank, Calif., is equipping a feeder plant in Beverly Hills, Calif., to start production late in September on wing and tail sections of Super-Constellation transports. It is the first feeder plant established by Lockheed since World War II, when similar subassembly operations were activated in nearby cities. Lockheed is installing a 2,370,000-pound hydraulic metal-forming press, which will exert 8000 tons of pressure, in its Burbank plant.

Wilcox-Gay Leases Factory

Wilcox-Gay Corp., Charlotte, Mich., leased an 85,000 square foot factory in Burbank, Calif., for manufacture of Majestic television and radio receivers and Wilcox Gay Recordios.

Furnace Maker Builds Plant

Lepel High Frequency Laboratories Inc., New York, maker of hardening, annealing, melting and brazing furnaces and radio bombarding apparatus, is building a plant in Woodside, Long Island, N. Y., which will be completed next month.

Hilliard Appoints Agent

Hilliard Corp., Elmira, N. Y., appointed Guy T. Martin & Co., Gardena, Calif., as representatives in California to distribute the company's line of lubricating, fuel and industrial oil purification equipment.

New Baltimore Tool Shop

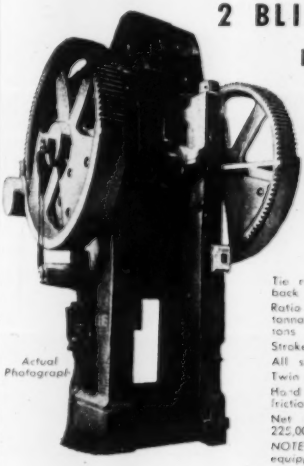
Baltimore-Diecraft opened its new 30,000 square foot plant on Pulaski highway at Golden Ring road, Baltimore. Diecraft has no products of its own and is devoted entirely to precision metal fabrication on a jobbing basis. It has facilities

A RARE BUY

2 BLISS #410A

DOUBLE CRANK

TOGGLE DRAWING PRESSES



Actual Photograph

Tie rod construction double back geared

Ratio — 50:1 — Approx. rated tonnage drawing stroke 4.25 tons

Strokes per minute—6

All steel gearing

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Hand actuated double grip friction clutch

Net weight approximately 225,000#

NOTE — One machine equipped with Pneumatic Cushion

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Here is a machine that greatly simplifies not only the drilling of cotter pin holes in clevis pins and screws but also in countersinking both sides. It performs these operations at the rate of 1500 pieces per hour.

The machine is fully automatic, employing 4 model KH Govro-Nelson Automatic Drilling Units which operate simultaneously in conjunction with and completely interlocked with a Geneva type, 8-station indexing dial and a hopper part-feeding mechanism.

The part is first countersunk on one side by one drilling unit. Two units then accomplish the drilling in two stations, thereby reducing the drilling time per piece. The part is then countersunk on the other side by the fourth drilling unit.

If you have similar drilling or countersinking operations, and would like to speed up your production rate, send samples and part prints and we shall be pleased to recommend the proper Automatic Units or quote on a complete set-up.

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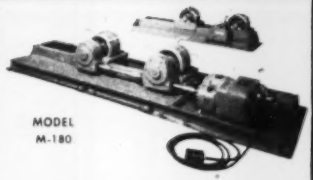

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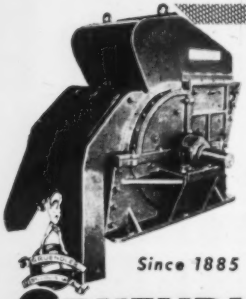

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to manufacture all types of production tools, stamping dies, forging dies, diecasting and plastic molds. The company also has a battery of punch presses as well as production milling machines, a turret lathe department and automatic screw machines. Merrill S. Matson is general manager.

Boosts Dunkirk Plant Output

True Temper Corp., Cleveland, will boost output from 35 to 40 per cent at its Dunkirk, N. Y., plant. New equipment will be installed and existing floor space will be utilized more efficiently.

Gets $6 Million Contract

Erie Foundry Co., Erie, Pa., received a $6 million Army Air Force contract for 128 steam hammers with delivery to be made over a two or three year period.

Forms Aircraft Tool Firm

J. & L. Tools, 5003 East Slauson Ave., Maywood, Calif., owned by Robert H. Brown, was formed to manufacture tools, jigs, and fixtures for the aircraft industry.

Buffalo Electronics Corp.

Buffalo Electronics Corp., Buffalo, leased space at 37 Franklin St., that city, for the design and manufacture of electronics equipment.

Opens West Coast Can Plant

Continental Can Co., New York, opened its new $2 million 240,000 square foot Terminal Island, Los Angeles plant. To serve the fish packing industry in Los Angeles and San Diego, Continental's 12th plant on the West Coast will produce 2000 cans per minute.

Bryant Heater Distributor

Affiliated Gas Equipment Inc.'s Bryant Heater Division, Cleveland, appointed Dykes Co. Inc. as its distributor for northern Louisiana and part of Texas and Arkansas. Dykes Co., with headquarters at 1012 Market St., Shreveport, La., will distribute Bryant heating, water heating and air conditioning equipment.

Forms Chemical Division

Frank Samuel & Co. Inc., New York, established a Chemical Division under the management of David R. Chamberlain, formerly secretary of William S. Gray & Co., and Gerald E. Sternheim, formerly export manager of Rosenthal Bercow Co. H. P. Banks, who handles ferrous ores, and R. C. Clark, who is the New York manager of Nathan Trotter & Co. whose business in New York is nonferrous metals, will also be connected with the Chemicals Division. The principal business of Frank Samuel & Co. is ferrous ores.

NOT PISA: Dwarfing the workers building it is this draft stack for a battery of 63 by-product coke ovens at Republic Steel Corp.'s Cleveland plant. The stack, now about 80 feet into the sky, is one step in Republic's program to increase its Cleveland steelmaking facilities by 672,000 net tons a year

Motor Firm Changes Name

To prevent confusion in the trade between the name of Electro Machines Inc. and several similar firm names, and to better identify name with product, the company changed its name to Doerr Electric Corp. This Cedarburg, Wis., firm manufactures electric motors. There is no change in ownership, management, policies or personnel.

Boyar-Schultz Opens Office

Boyar-Schultz Corp., Chicago, opened an office for sales and service at 401 Broadway, New York. A complete line of Boyar-Schultz screw machine tools, copper head laps, and SMB machine bolts will be carried in stock. The company's profile and surface grinders may also be sold and serviced from the New York offices. The office will be under the management of Oliver J. Green and under the supervision of E. M. Baumruck, eastern sales manager.

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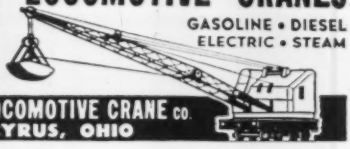

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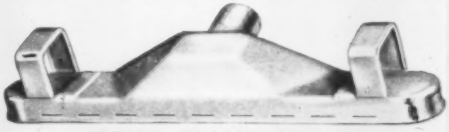

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1—HD-19 AC Baker H. Dozer
4—TD-24 Int.—angle, cable and bull
4—TD-18 Int. Angle and winch
5—TD-14 Int. Angle winch & bull
1—TD-13 Int. winch & high lift
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2—Hendrickson Diesel
2—K8R 11 International 47
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Consisting of odds & ends

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4—¾ yd. Lorain, truck & cat mounted
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1—125 bbl. Smith on Lowboy trailer
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3—25 bbl. Smith on tracks, air comp. etc.
2—12 bbl. Smith on tracks, air comp. etc.

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4—6" Jaeger, gas driven
3—6" Gorman Rupp, gas driven
7—4" Gorman Rupp, gas driven
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1—3" Marlow, gas driven
1—2" Garver, gas driven

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WANTED — MIDWEST MANUFACTURING Plant needs an experienced Foreman for Stamping Department. In addition must be familiar with Deep Drawing Work. Replies held strictly confidential. Write Box 319, STEEL, Penton Bldg., Cleveland 13, O.

FOREMAN—TOOL AND DIE. EXCELLENT opportunity for right man. Willing to relocate in Midwest area. Salary open. All replies completely confidential. Write Box 318, STEEL, Penton Bldg., Cleveland 13, O.

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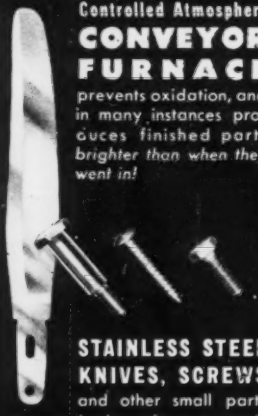

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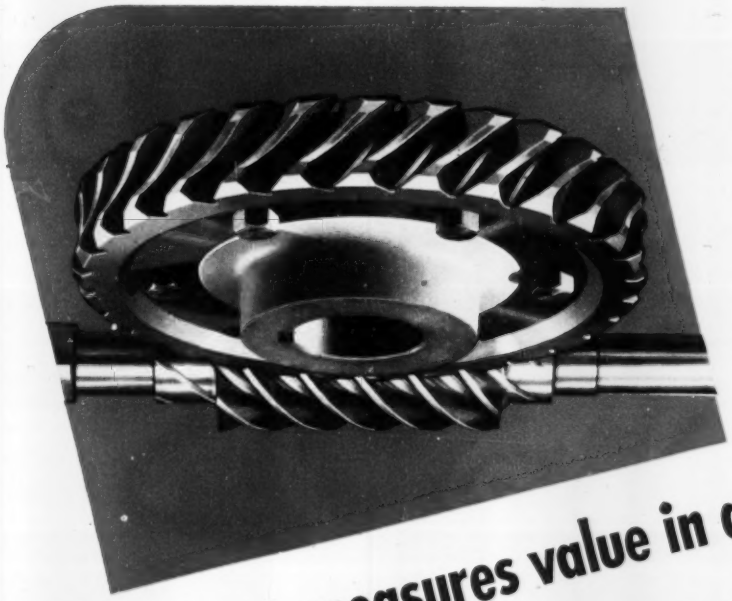

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Worm Gear
Drives

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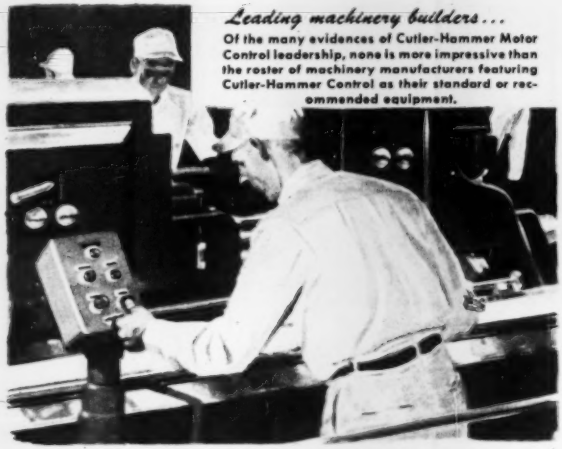
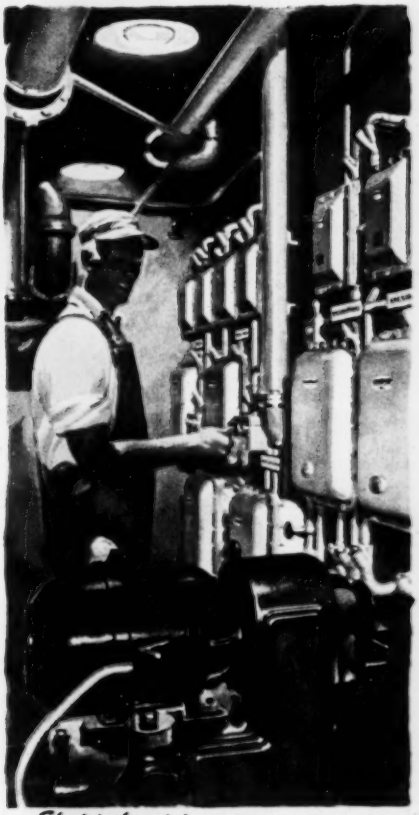


Leading machinery builders...

Of the many evidences of Cutler-Hammer Motor Control leadership, none is more impressive than the roster of machinery manufacturers featuring Cutler-Hammer Control as their standard or recommended equipment.



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Claims and counterclaims mean little to the men who spend their lives keeping electrical equipment working properly. These practical men know the facts by actual comparison when they say, "Cutler-Hammer is No. 1".

Does it matter whether you specify the motor control you buy by name? Is there any real difference between the various makes of motor control you are offered? They all *look* very much alike. Is it fact or fancy that there are marked differences in the way they will perform, in the dependability with which they will do their work, in the length of service they will provide?

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Cutler-Hammer general purpose motor control is recommended by a majority of all electric motor manufacturers, featured as standard equipment by leading machinery builders, and carried in stock by recognized electrical wholesalers in every locality.

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